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Prepainted Steel Sheets

彩涂钢板

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宝山钢铁股份有限公司
BAOSHAN IRON & STEEL CO., LTD.

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简介

宝山钢铁股份有限公司（以下简称“宝钢股份”）成立于 2000 年 2 月 3 日，同年 12 月 12 日在上海证券交易所上市。宝钢股份是全球领先的现代化钢铁联合企业，是《财富》世界 500 强中国宝武钢铁集团有限公司的核心企业。在国内，宝钢股份在冷轧板卷、热轧板卷、无缝钢管等产品的制造和销售中始终处于业内领导地位，是汽车、家电、石油天然气开采等行业优秀的钢铁供应商。2004 年，集团母公司以多年奋斗所形成的竞争实力，登上了国际经济的大舞台，在中国钢铁制造业中率先进入世界 500 强。宝钢股份致力建成领先的建筑用钢精品生产基地，彩涂生产线设备一流，工艺技术先进，基板品种规格齐全，涂料种类功能广泛，年产能达到 115 万吨，能适应建筑、家电等多种用途，目前已经广泛应用于机场、体育馆、民用、工业厂房建筑等。

Baoshan Iron & Steel Co., Ltd. (hereinafter referred to as Baosteel) was established on Feb. 3, 2000 and listed on Shanghai Stock Exchange on Dec. 12 in the same year. Baosteel is a globally leading modern steel conglomerate and a core enterprise of China Baowu Steel Group, a Fortune Global 500 company. At home, Baosteel has always taken the leading position in manufacturing and selling cold rolled steel products, hot rolled steel products, seamless steel tubes, etc. and has grown up into an excellent iron & steel providers to the industries covering auto, electrical household appliances, petroleum, etc. In 2004, Parent company of baosteel took the lead to rank among the world top 500 enterprises in China's iron & steel industry, and was denowned worldwide. Baosteel is a leading base of constructional steel, having topping production lines of prepainted steel sheets with advanced technologies, a complete set of base metal products in specifications, a great diversity of coatings and annual ability up to 1.15 million tons. Its products are widely used in architecture, electrical household appliance, airport, sports hall, civilian building, factory, etc.



Overview of Prepainted Steel Sheets

彩涂概述



Prepainted Steel Sheets

彩涂板简介

- ▶ 在钢板上涂上有有机涂料，涂料可以有各种不同的颜色，彩色涂层钢板由此而得名，简称彩板，也称有机涂层钢板。由于彩色涂层钢板是在钢板加工成型前先涂上涂料，在国外也称为预涂层钢板。彩涂板有机涂层起了覆盖隔离作用，可防止钢板生锈，使用寿命更长。
- ▶ 彩涂的基板有冷轧基板、热镀锌基板、电镀锌基板、热镀锌铝镁基板、热镀锌铝硅基板、热镀锌镁基板。彩涂板的面漆涂层种类主要分为：聚酯，硅改性聚酯，聚偏二氟乙烯，高耐久性聚酯等。
- ▶ 生产工艺从一涂一烘发展到了二涂二烘，也出现三涂三烘的工艺。
- ▶ 彩涂板的颜色可以有很多种，如桔黄、奶黄，深天蓝、海蓝，绯红、砖红、象牙、瓷蓝等。
- ▶ 彩涂板的表面状态可以分成正常涂层板、压花板、印花板。
- ▶ 彩涂板市场用途主要分为建筑、家电等。

彩涂板发展

- ▶ 彩色涂层钢板二十世纪三十年代中期产生于美国，开始是窄带钢涂漆，美国在 1955 年建造了第一批宽带材涂层机组。二十世纪六十年代，涂层钢板在美国、欧洲和日本得到了迅速的发展。
- ▶ 我国在八十年代之前彩色涂层钢板产品的生产基本上属于空白。直到八十年代武钢、宝钢才相继建了二涂二烘型式的彩色涂层钢板生产线，填补了国内空白。随着宝钢彩色涂层钢板产品在国内的推广以及应用领域的扩大，人们对彩板的认识也越来越提高，因此到二十世纪末，二十一世纪初，国内彩色涂层钢板生产线如雨后天春笋般地建了起来，用量也大大增加。

Brief Introduction

- ▶ Prepainted steel sheet is coated with organic layer, which provides higher anti-corrosion property and a longer lifespan than that of galvanized steel sheets.
- ▶ The base metals for prepainted steel sheet consist of cold-rolled, hot-dip zinc coating, electrolytically zinc alloy coated, hot-dip aluminum-zinc-magnesium alloy coated, hot-dip zinc-aluminum-magnesium alloy coated, hot-dip zinc-magnesium alloy coated steel. The finish coats of prepainted steel sheets can be classified into groups as follows: polyester, silicon modified polyesters, polyvinylidene fluoride, high-durability polyester, etc.
- ▶ The production process has evolved from one-coating-and-one-baking to double-coating-and-double-baking, and even three-coating-and-three-baking.
- ▶ The color of the prepainted steel sheet has a very wide selection, like orange, cream-colored, dark sky blue, sea blue, bright red, brick red, ivory white, porcelain blue, etc.
- ▶ The prepainted steel sheets can also be classified into groups by their surface textures, namely regular prepainted sheets, embossed sheets and printed sheets.
- ▶ The prepainted steel sheets are mainly provided for various commercial purposes covering architectural construction, electrical household appliances, etc.

History of Prepainted Steel Sheet

- ▶ The production of prepainted steel sheet originated in the United States in the mid 1930s. At the beginning, the technology was only adopted in producing prepainted steel strip. Till 1995, the first batch of coating equipment for broad strip steel was invented and produced in the United States in 1955. In the 1960s, the production of prepainted steel sheet made a rapid development in the United States, Europe and Japan. Besides, the prepainted steel products were also developed greatly all over the world.
- ▶ By the end of the 1980s, the production of prepainted steel sheet in China had been almost blank. Until the 1980s, Wusteel and Baosteel established the double-coating-double-baking production lines of prepainted steel sheets in succession. With increasingly promotion and application of Baosteel's prepainted steel sheets at home, more and more people make themselves acquainted with the production of steel sheets. Thus, at the turning point of the 20th century the 21st century, a lot of production lines of prepainted steel sheets emerged like bamboo shoots after a spring rain and there was also a great demand for such products.

典型彩涂板剖面结构示意图
Sketch Map of Sectional Structure of
Prepainted Steel Sheet

- 精涂层 (Finished coating)
- 初涂层 (Primer)
- 化学转化层 (Chemical conversion coating)
- 镀层 (Metallic coating)
- 冷轧板 (Cold-rolled steel sheet)



Overview of Prepainted Steel Sheets

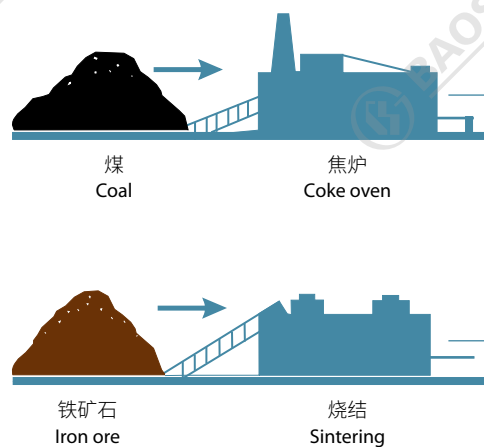
彩涂概述

主要生产流程

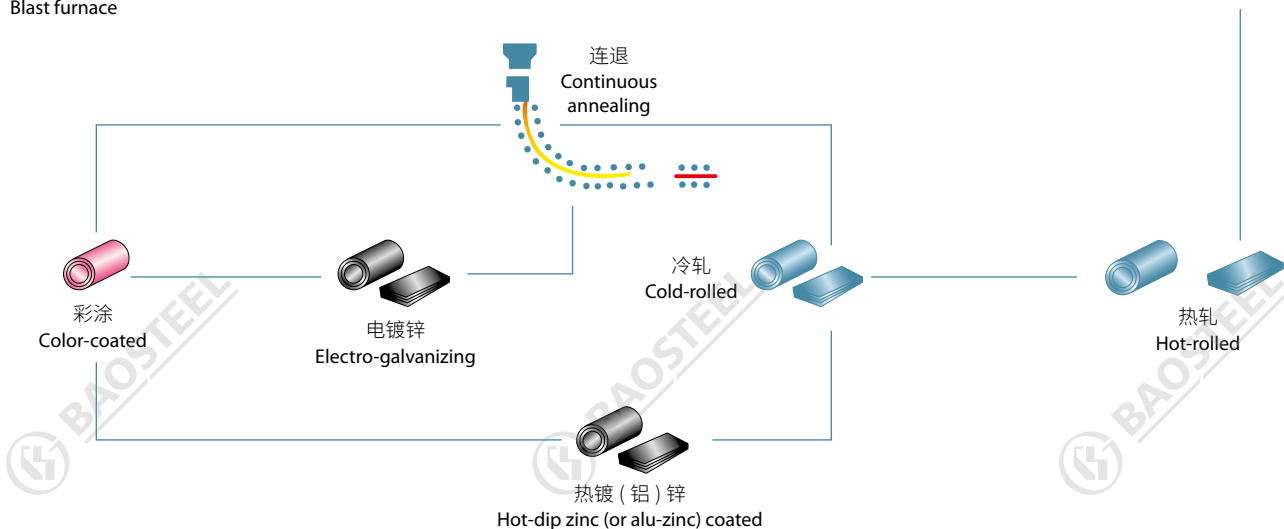
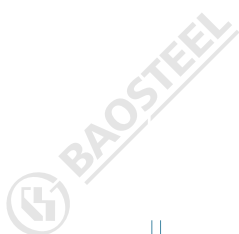
Diagram of Main Production Process



Prepainted Steel Sheets



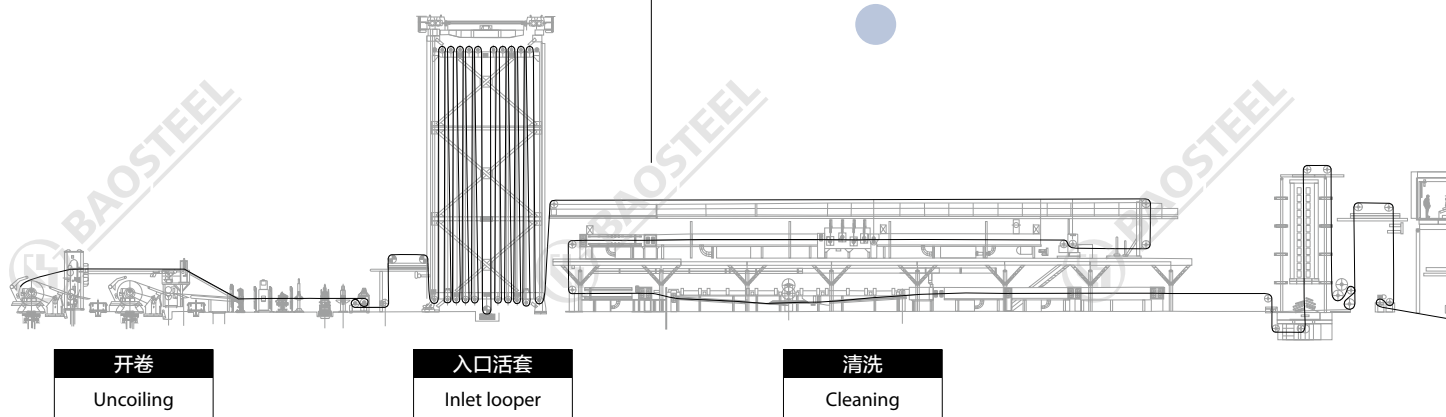
**Prepainted
Steel Sheets**



Overview of Prepainted Steel Sheets

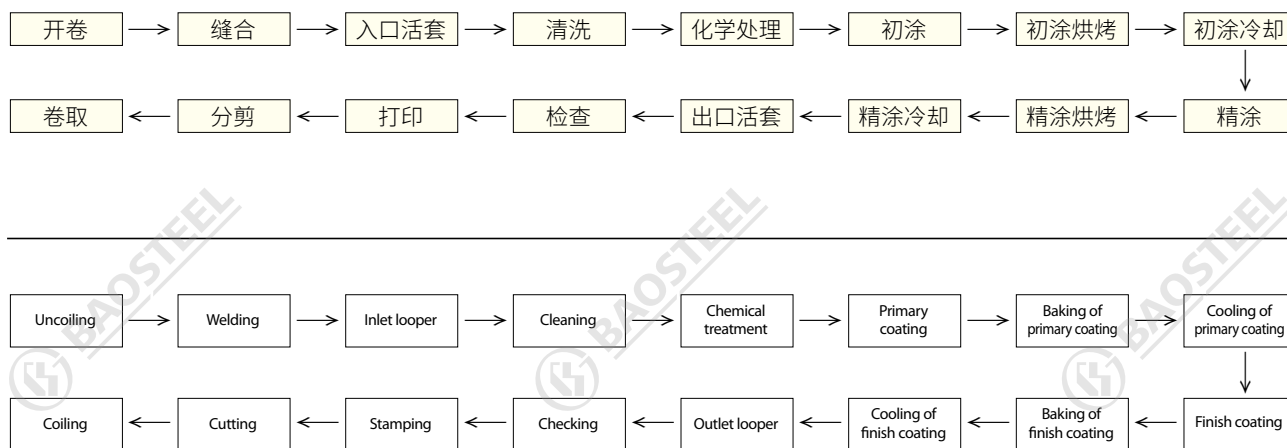
彩涂概述

工艺 Process



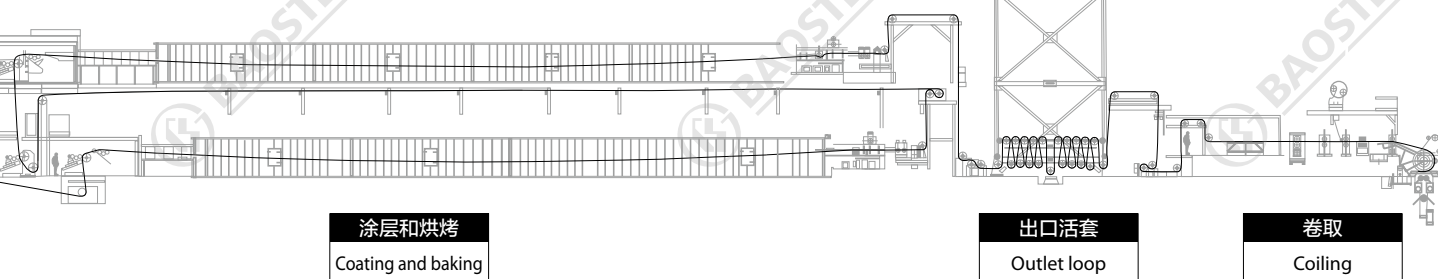
简单的工艺流程

Brief Production Flow of Prepainted Steel

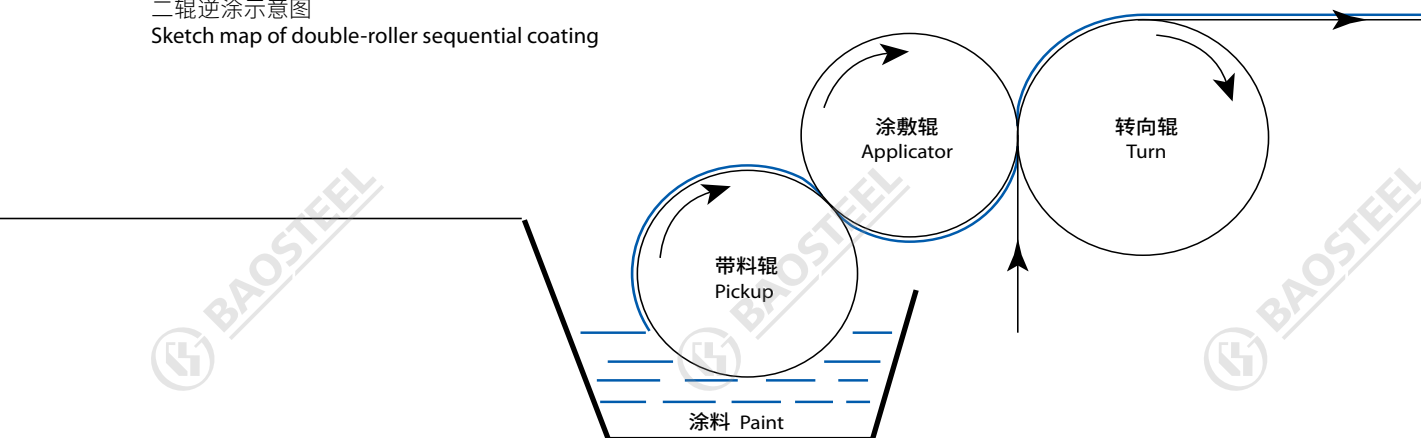




Prepainted Steel Sheets: Advanced Process



二辊逆涂示意图
Sketch map of double-roller sequential coating





Prepainted Steel Sheets

Overview of Prepainted Steel Sheets

彩涂概述

机组 Production Line

- ▶ 宝钢已建成 6 条大型的二涂二烘型彩涂涂层钢板生产线，设计年产量总共可达 115 万吨，其中宝山 3 条，青山 2 条，东山 1 条。梅山新增 1 条产线，设计产能 21 万吨，预计 2025 年投产。

6 production lines of double-coating-double-baking prepainted steel with a total designed output of 1.15 million tons are achieved. A new production line in Meishan Base is expected to be put into operation in 2025, with a designed capacity of 0.21 million tons.

**Prepainted
Steel Sheets**



宝钢 7 条彩涂线有关情况

Several introductions to Baosteel’s 7 production lines of prepainted steel:

| | 1号线 NO.1 | 2号线 NO.2 | 3号线 NO.3 | 4号线 NO.4 | 5号线 NO.5 | 6号线 NO.6 | 7号线 (预计2025年投产) NO.7 (Expected in 2025) |
|-----------------|---|-------------|-------------|-----------------------|-----------------------|-----------------------|--|
| | 宝山基地 Baoshan base | | | 青山基地 Qingshan base | 东山基地 Dongshan base | 青山基地 Qingshan base | 梅山基地 Meishan base |
| 产能 Capacity | 22 | 17 | 15 | 20 | 20 | 21 | 21 |
| 基板 Substrate | 冷轧、热镀锌、电镀锌、热镀锌铝镁、热镀锌铝镁、热镀锌镁 Cold rolled, hot-dip zinc coating, electrolytically zinc alloy coated,hot-dip aluminum-zinc alloy coated, hot-dip zinc-aluminum-magnesium alloy coated, hot-dip zinc-magnesium alloy coated steel | | | | | | |

Overview of Prepainted Steel Sheets

彩涂概述

涂层结构 Coating Structure



Prepainted Steel Sheets

► 1、涂层结构类型：

2/1： 上表面涂二次，下表面涂一次，烘烤二次。

2/1M： 上下表面各涂二次，烘烤二次。

2/2： 上下表面各涂二次，烘烤二次。

► 2、不同涂层结构的用途

2/1： 单层背面漆的耐蚀性、抗划伤性较差，但具有良好的粘结性，主要应用于夹芯板；

2/1M： 背面漆的耐蚀性，抗划伤性和加工成型性较好，具有良好的粘结性，适用与单层压型板和夹芯板。

2/2： 双层背面漆的耐蚀性、抗划伤性和加工成型性较好，多数用于单层压型板，但其粘结性不良，不宜用于夹芯板等需要粘结的用途。

► 1. Type of coating structure

2/1: Coat the top surface of the steel sheet twice, coat the lower surface once, and bake the sheet twice.

2/1M: Coat and bake twice for both top surface and under-surface.

2/2: Coat the top/lower surface twice and bake twice.

► 2. Usage of different coating structures

2/1: The anti-corrosion property and scratch resistance of the single-layer backside coating is relatively poor, however, its adhesive property is good. The prepainted steel sheet of this kind is mainly used for sandwich panel;

2/1M: Back coating has good corrosion resistance, scratch resistance and molding performance. Besides it has good adhesion and is applicable for single layer panel and sandwich sheet.

2/2: The anti-corrosion property, scratch resistance and processing property of the backside coating of prepainted steel sheet is better, so it is widely used for roll forming. But its adhesive property is poor, so it is not used for sandwich panel or application which need to be bonded.

彩涂分类及代号

Category & Coding of Prepainted Steel Sheet

| 分类 / Classification | 项目 / Item | 代号 / Code |
|---|---|------------|
| 用途 Applications | 建筑外用 / Construction external use | JW |
| | 建筑内用 / Construction internal use | JN |
| | 钢窗 / Steel windows | GC |
| | 家电 / Household appliance | JD |
| | 家具 / Furniture | JJ |
| | 其它 / Others | QT |
| 涂层表面状态 Surface finish | 涂层板 / Normal coated | TC |
| | 压花板 / Embossed | YA |
| | 印花板 / Printed | YI |
| | 网纹板 / Checker | WA |
| | 绒面板 / Suede | RO |
| | 珠光板 / Pearly-lustre | ZH |
| | 抗刮板 / Anti-scutting | KA |
| 面漆种类 Types of top coatings | 聚酯 / PE | PE |
| | 硅改性聚酯 / Silicon modified polyesters | SMP |
| | 高耐久性聚酯 / High-durability polyester | HDP |
| | 聚偏二氟乙烯 / Polyvinylidene fluoride | PVDF(PVF2) |
| 面漆功能 Base metal | 普通 / Regular | / |
| | 自洁 / Self cleaning | AP |
| | 抗静电 / Antistatic | AS |
| | 抗菌 / Antisepite | AB |
| | 隔热 / Adiabatic | AH |
| 基板类型 Substrate | 电镀锌板 / Electro-galvanized base metal | ZE |
| | 热镀锌板 / Hot-dip zinc coated base metal | Z |
| | 热镀锌板 / Hot dip Al-Zn steel sheet | AZ |
| | 热镀锌镁 / Hot-dip zinc-magnesium | ZM |
| | 热镀锌铝镁 / Hot-dip zinc-aluminum-magnesium | XM |
| | 热镀锌铝镁 / Hot-dip aluminum-zinc-magnesium | AM |
| 基板表面预处理类型 Pretreatment types for substrate surface | 普通化学预处理 / Normal chemical pretreatment | C |
| | 无铬化学预处理 / Chrome free chemical pretreatment | C5 |
| 涂层结构 Coating type | 正面二层、反面一层 / Two coatings on top side, and one coating on the bottom | 2/1 |
| | 正面二层、反面二层 / Two coatings on top side, and two coatings on the bottom | 2/2 |
| | 正面二层、反面二层(注:反面涂层的厚度低于2/2产品反面涂层的厚度) Two coatings on top side, and two coatings on the bottom (Note: The thickness of bottom side coating is smaller than that of the product type 2/2) | 2/1 M |



Prepainted Steel Sheets

Introduction of Usage

用途简介

建筑 Construction

彩涂板是木材和其他材料的具有竞争力的取代者，因为它们具有防止褪色、耐大气腐蚀，抗粉化等优点。它们使建筑的维护费用降到最低的水平。同时，各种各样的颜色，表面结构和镀层，使它具有极大的灵活性和可选性。

在我国大部分彩板应用于建筑，宝钢彩涂板在建筑行业也得到了广泛的应用。

宝钢彩涂板和镀锌板满足了大型场馆建设中对材料色彩、造型、品质、性能等各方面的苛刻要求。在我国会展中心、体育场馆、航空枢纽、文化设施等许多标志性建筑中得到了认可。经过 30 多年不断探索和改进，不仅在钢铁行业得到成熟的应用，在汽车制造、有色金属、电力、煤矿、轻工、医药、食品等行业也得到了普遍认可。从学校、住宅到商业建筑，从别墅到高层商住楼，时刻为您营造温馨、和谐、舒适的生活环境。



彩色涂层钢板的用途分类

Application of Prepainted Steel Sheets

| | | |
|----------------------------|---------------|--|
| 建筑业 Construction | 室外 Outside | 厂房、农用仓库、住宅预制构件、瓦楞屋顶、墙壁、雨水管道、阳台、货售亭、卷帘门 workshop, agricultural warehouse, residential precast unit, corrugated roof, wall, rainwater drainage pipe, terrace, retailer booth, roller shutter door |
| | 室内 Inside | 门、门框、房屋轻钢结构、屏风、天花板、电梯、楼梯、通风道 door, doorcase, light steel roof structure, folding screen, ceiling, elevator, stairway, vent gutter |
| 电器 Electrical appliance | | 冰箱、洗衣机、开关柜、仪表柜、空调、微波炉、面包机 refrigerator, washer, switch cabinet, instrument cabinet, air conditioning, micro-wave oven, bread maker |
| 家具 Furniture | | 暖气片、灯罩、衣柜、桌子、床、更衣箱、书架 central heating slice, lampshade, chifforobe, desk, bed, locker, bookshelf |
| 运输业 Carrying trade | | 汽车和火车内装饰、隔板、集装箱、隔离栏、轮船隔仓板 exterior decoration of auto and train, clapboard, container, isolation lairage, isolation board |
| 其它 Others | | 写字用白板、垃圾箱、广告牌、钟表、打字机、仪表盘、体重器、照相器材 writing panel, garbage can, billboard, timekeeper, typewriter, instrument panel, weight sensor, photographic equipment |

The prepainted steel sheet for construction is an attractive substitute for wood and other materials, owing to its advantages, including fast color, good durability performance, chalking resistance, etc. It minimizes the maintenance cost. At the same time, various colors, surface structures and coatings provide such products with great flexibility and option.

In China, most of color coated sheets are applied in construction, and Baosteel's prepainted steel sheets are also widely used in such field.

Baosteel's prepainted steel sheets satisfy the large-scale halls' rigorous requirements in construction in material color, shape, quality, property, etc. They have been recognized by many landmark buildings in China, covering hall centers, sports halls, aviation knobs, cultural facilities, etc. After more than 30 years' continuous research and improvement, Baosteel has been not only widely used but also been commonly recognized in auto, non-ferrous metal, power industry, coal mining, light industry, medicine, foodstuff, etc. Baosteel's construction steel has already substituted traditional build-



ing materials with its safety, durability, esthetic quality and environmental-friendly property, for always building up a comfortable, harmonious and cozy living environment, from schools and residences to commercial buildings, and from villas to top-grade commercial apartments.



Prepainted Steel Sheets

Introduction of Usage

用途简介

家电

Household Appliances

- ▶ 家电彩板一般以热镀锌、电镀锌等为基板，用于生产冰箱和大型空调系统，冰柜、面包机、家具等。
- ▶ 家电产品的应用始于良好的外观。
- ▶ 保证质量，拒绝污迹，是宝钢彩涂产品的承诺。它可应用于冰箱、冷冻柜、洗衣机、空调和其他家电产品。我们的彩涂产品生产线，装备了一流的生产控制和检化验装置，同时，我们在彩涂板生产中积累的大量经验，使我们的产品质量胜人一筹。精良的包装和便捷的物流系统，保证我们的产品以零缺陷交付给您。一批批高光泽，高质量的彩涂产品已经交到家电产品用户的手上，使他们在产品、质量上具备了良好的竞争优势。

**Prepainted
Steel Sheets**

- ▶ Home appliance prepainted steel are generally made of hot-dip galvanized, electroplated and other substrates, used in the production of refrigerators and large air conditioning systems, freezers, bread makers, furniture, etc.
- ▶ The distribution of electrical household appliances is started from their good appearances.
- ▶ Baosteel promises to guarantee the quality of its prepainted steel products. Its products can be applied to refrigerators, refrigerating cabinets, washers, air conditionings and other household appliances. Baosteel's production lines of prepainted steel products are equipped with first-grade equipment of production control, check and inspection, at the same time; its products also take the leading position among fellow ones with Baosteel's abundant experience in the production of prepainted steel sheets. With excellent packing and convenient logistic system, Baosteel guarantees to deliver its customers the products with zero defect. Batches of prepainted steel products with good luster and high quality that have already delivered to all the providers of electrical household appliances offer them a powerful competitive force in quality.



Introduction of Base Metals

基板介绍

种类 Type



Prepainted Steel Sheets

彩涂板的基板可以分为冷轧、热镀锌、电镀锌、热镀锌铝镁、热镀锌铝镁、热镀锌镁镀层基板。

▶ 冷轧基板

由冷轧基板生产的彩涂板，具有平滑美丽的外观，且具有冷轧板的加工性能；但是表面涂层的任何细小划伤都会把冷轧基板暴露在空气中，从而使露铁处很快生成红锈。因此这类产品只能用于要求不高的临时隔离措施和作室内用材。

▶ 热镀锌基板

热镀锌彩涂板除具有锌的保护作用外，表面上的有机涂层还起了隔绝保护、防止生锈的作用，使用寿命比热镀锌板更长。热镀锌基板的含锌量一般为 $180\text{g}/\text{m}^2$ （双面），建筑外用热镀锌基板的镀锌量最高为 $275\text{g}/\text{m}^2$ （双面）。

▶ 热镀锌铝基板

采用热镀锌钢板 (50%~60%Al-Zn) 作为彩涂基板。通常含铝锌量为 $150\text{g}/\text{m}^2$ （双面）。

热镀锌铝耐蚀性优于热镀锌，是理想的建筑材料。

▶ 电镀锌基板

通常含锌量为 $20/20\text{g}/\text{m}^2$ ，因此该产品不适合使用在室外制作墙、屋顶等。但因具有美丽的外观和优良的加工性能，因此主要可用于家电、音响、家具、室内装潢等。

▶ 热镀锌铝镁 / 热镀锌铝镁 / 热镀锌镁镀层基板

在现有的热镀锌或热镀锌铝镀层中上添加一定铝镁等相关微量元素，达到提升钢板耐蚀性能、切边保护性能的目的。已有公开的实验室加速实验、户外暴露实验等结果表明，一定范围内 Al、Mg 含量增加会提高耐蚀性几倍到十几倍。加 Mg 之后的另一大优点是钢板的切边耐蚀性提高，含 Mg 的 Zn 基腐蚀产物会覆盖在切口表面，从而对切口形成保护。

The base metals for prepainted steel sheet consist of cold-rolled, hot-dip zinc coated, electrolytically zinc alloy coated, hot-dip aluminum-zinc-magnesium alloy coated, hot-dip zinc-aluminum-magnesium alloy coated, hot-dip zinc-magnesium alloy coated steel.

► **Cold-rolled base metal**

The prepainted steel sheet processed with cold-rolled base metal features in its smooth and beautiful appearance and the machinability of cold rolled steel sheet, however, in case of any tiny scratch on the top coating may expose the cold rolled base metal in the air and the exposed base metal may rust soon. Thus, the products of this kind can only be used as temporary isolation measures and indoor materials with low requirements.

► **Hot-dip zinc coated base metal**

The prepainted steel sheet with hot-dip zinc-coated base metal as its base metal not only has the protective function of zinc coating but also has an isolation and protection function with its organic layer that prevents it from rusting and prolongs its service span longer, than that of hot-dip zinc steel sheet. The zinc content of hot-dip zinc base metal is generally 180 per 1 square meters(both sides), while that of the hot-dip zinc base metal for construction outdoors is 275 square meters per 1 square meters.

► **Hop-dip alu-zinc base metal**

The hop-dip alu-zinc base metal adopts the hot-dip zinc-aluminum coated steel sheet (50%~60%Al-Zn) as its prepainted base metal. The usual aluminum zinc content is 150g/m² (double-sided).

Hot dip aluminum zinc has better corrosion resistance than hot-dip galvanizing, making it an ideal building material.

► **Electro-galvanized base metal**

The prepainted electro-galvanized steel sheet adopts an electro-galvanized base metal coated and baked with an organic coating. Owing to the thin zinc-coated layer of the electro-galvanized base metal, the zinc content of the prepainted steel sheet of electro-galvanized base metal is usually 20/20g/m², and the products of this kind are not suitable for building walls or roofs outdoors. However, it has esthetic appearance and excellent machinability, which makes it suitable for electrical household appliances, acoustic devices, steel household appliances, interior decoration, etc.



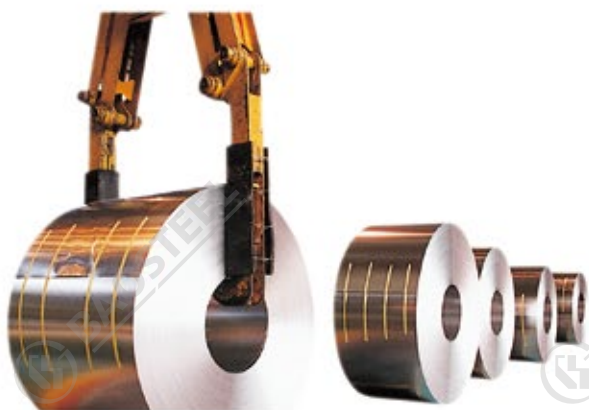
► **Hot-dip aluminum-zinc-magnesium/zinc-aluminum-magnesium/ hot-dip zinc-magnesium alloy coated based**

A certain proportion of trace elements such as Al/Mg are compounded into the hot-dip zinc coat or hot-dip al-zn coat. The purpose aims the promotion of the ability of anti-corrosion and cutting edge protection. The public accelerating and exposure experiments reveal the enhancement of ability in anti-corrosion with a certain proportion of Al and Mg will be significant as several times to more than ten times. Furthermore, another appreciable benefit of adding the element of Mg is the promotion in the anti-corrosion on the cutting edges. The remained film of Mg-Zn after the corrosion promises a better protection for the cutting edges.

Introduction of Base Metals

基板介绍

特性 Characteristics



Prepainted Steel Sheets

一、环境与镀层对基板寿命的影响

基板的镀层种类、镀层重量以及不同的使用环境对基板的使用寿命起着决定性的作用。如图一、图二所示：

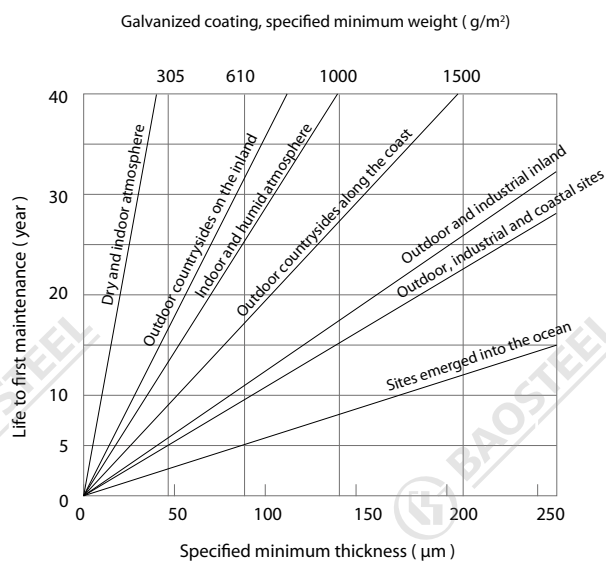
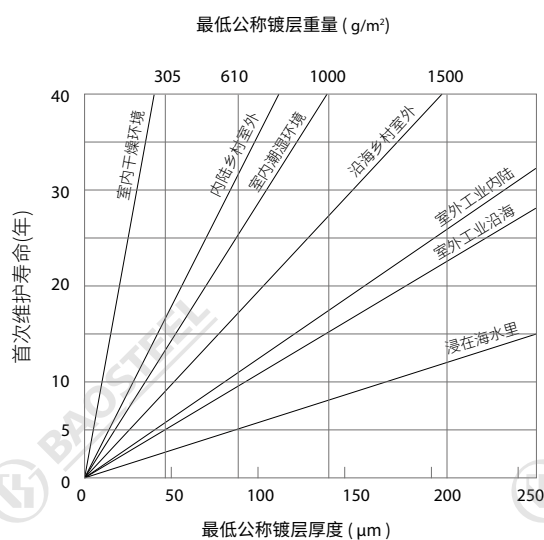
1. Longevity of base metal influenced by environment and coating

The longevity of the base metal would be influenced by coating types, weight and environment. For details, please refer to the diagram 1, 2:

**Prepainted
Steel Sheets**

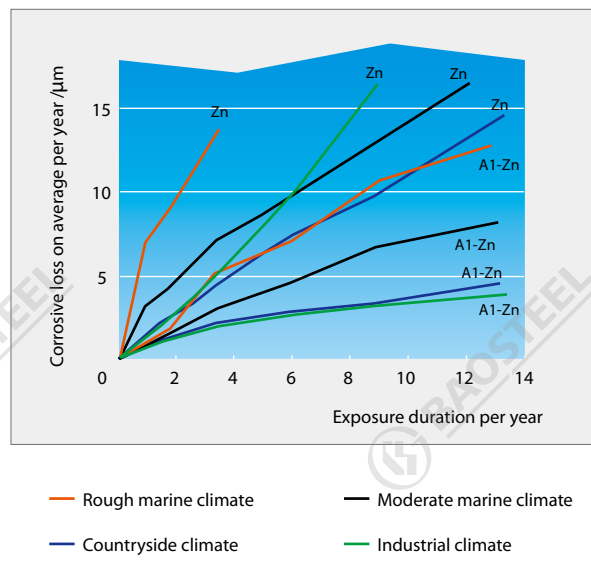
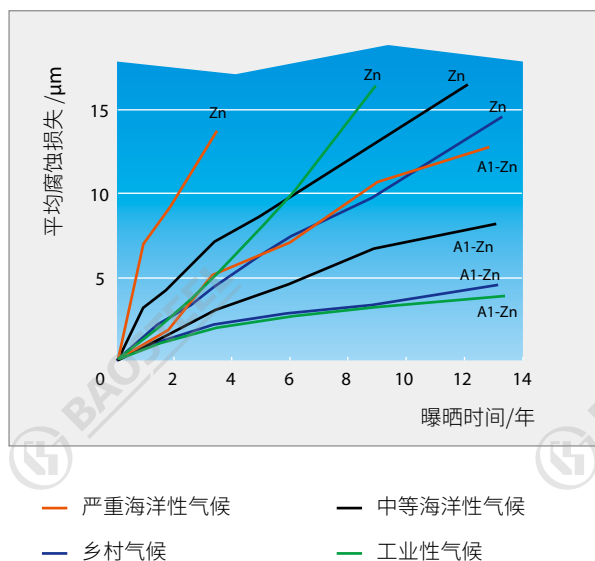
图表一：镀层重量在不同环境的表现（源于 BS5493-1977）

Diagram 1: typical lives of zinc coatings in selected environments (from BS5493-1977)



图表二：大气曝晒实验

Diagram 2: Atmospheric Exposure Test



二、宝钢彩涂产品特性

Characteristics of prepainted steel products

1、彩涂常用牌号及用途

Type and usage of prepainted steel sheet:

| 基板类型 Type of base metal | 彩涂牌号 Steel grade | 基板牌号 Grade of base metal | 用途 Application |
|--|---------------------|-----------------------------|-------------------------------------|
| 热镀锌 Hot-dip zinc coated | TDC51D+Z | DC51D+Z | 一般用 / Normal use |
| | TDC52D+Z | DC52D+Z | 冲压用 / For drawing |
| | TDC53D+Z | DC53D+Z | 深冲用 / For deep drawing |
| | TS220GD+Z | S220GD+Z | 结构用 / Structure |
| | TS250GD+Z | S250GD+Z | 结构用 / Structure |
| | TS280GD+Z | S280GD+Z | 结构用 / Structure |
| | TS320GD+Z | S320GD+Z | 结构用 / Structure |
| | TS350GD+Z | S350GD+Z | 结构用 / Structure |
| | TS550GD+Z | S550GD+Z | 高强结构用 / For high-strength structure |
| 低铝锌铝镁 Hot-dip zn-al-mg coated substrate with a low proportion of Al | TDC51D+ZM | DC51D+ZM | 一般用 / Normal use |
| | TDC52D+ZM | DC52D+ZM | 冲压用 / For drawing |
| | TDC53D+ZM | DC53D+ZM | 深冲用 / For deep drawing |
| | TS220GD+ZM | S220GD+ZM | 结构用 / Structure |
| | TS250GD+ZM | S250GD+ZM | 结构用 / Structure |
| | TS280GD+ZM | S280GD+ZM | 结构用 / Structure |
| | TS320GD+ZM | S320GD+ZM | 结构用 / Structure |
| | TS350GD+ZM | S350GD+ZM | 结构用 / Structure |
| | TS550GD+ZM | S550GD+ZM | 高强结构用 / For high-strength structure |
| 镀铝锌 Hot-dip alu-zinc alloy coated | TDC51D+AZ | DC51D+AZ | 一般用 / Normal use |
| | TS250GD+AZ | S250GD+AZ | 结构用 / Structure |
| | TS300GD+AZ | S300GD+AZ | 结构用 / Structure |
| | TS350GD+AZ | S350GD+AZ | 结构用 / Structure |
| | TS450GD+AZ | S450GD+AZ | 结构用 / Structure |
| | TS550GD+AZ | S550GD+AZ | 高强结构用 / For high-strength structure |
| 电镀锌 Electro-galvanized | TSECC | SECC | 一般用 / Normal use |
| | TSECD | SECD | 冲压用 / For drawing |
| | TSECE | SECE | 深冲用 / For deep drawing |

| 基板类型 Type of base metal | 彩涂牌号 Steel grade | 基板牌号 Grade of base metal | 用途 Application |
|---|---------------------|-----------------------------|-------------------------------------|
| 高铝锌铝镁 Hot-dip aluminum-zinc-magnesium | TDC51D+AM | DC51D+AM | 一般用 / Normal use |
| | TS250GD+AM | S250GD+AM | 结构用 / Structure |
| | TS300GD+AM | S300GD+AM | 结构用 / Structure |
| | TS350GD+AM | S350GD+AM | 结构用 / Structure |
| | TS450GD+AM | S450GD+AM | 结构用 / Structure |
| | TS550GD+AM | S550GD+AM | 高强结构用 / For high-strength structure |

具体技术指标详见相应标准
Details as related standards

2、彩涂的力学性能按照相应基板的标准要求，不平度按照 Q/BQB 440，以镀铝锌和高铝基板为例，数据如下表。

The mechanical properties of the prepainted steel are based on the corresponding substrate, and the Flatness is according to Q/BQB 440. Taking AZ and AM substrates as examples, the data is shown in the table below.

表 1:

单位 / Unit: mm

| 牌号 Steel grade | 拉伸试验 ^{a, b, c} Tensile test ^{a, b, c} | | |
|-----------------------|--|---------------------------------|--|
| | 屈服强度 Yield strength MPa | 抗拉强度 Tensile strength MPa | 断后伸长率 ^a _{A_{80mm}} % 不小于 Elongation ^a _{A_{80mm}} % ≥ |
| TDC51D+AZ, TDC51D+AM, | 240~380 | 270~500 | 22 |
| TDC52D+AZ, TDC52D+AM, | 140~300 | 270~420 | 26 |
| TDC53D+AZ, TDC53D+AM, | 140~260 | 270~380 | 30 |
| TDC54D+AZ, TDC54D+AM, | 120~220 | 260~350 | 36 |

a 无明显屈服时采用 $R_{p0.2}$ ，否则采用 R_{el} 。

b 试样为GB/T 228.1规定的P6试样，试样方向为横向。

c 当产品公称厚度大于0.50mm，但小于等于0.70mm时，断后伸长率允许下降2%；当产品公称厚度不大于0.50mm时，断后伸长率允许下降4%。

a If no obvious yield strength appears, $R_{p0.2}$ would be used. For the rest, R_{el} should be used.

b The test samples are regulated as the P6 according to GB/T 228.1 with a transverse direction.

c The elongation permits a decline of 2% on the nominal thickness 0.5-0.7mm (excluding 0.5, but including 0.7).

表 2:

单位 / Unit: mm

| 牌号 Steel grade | 拉伸试验 ^{a, b, c} Tensile test ^{a, b, c} | | | |
|---|--|---|-------------------------------------|-------------------|
| | 屈服强度 不小于 Yield strength MPa ≥ | 抗拉强度 不小于 Tensile strength MPa ≥ | 断后伸长率 % 不小于 Elongation % ≥ | |
| | | | A _{80mm} | A _{50mm} |
| S250GD+AZ ^d , S250GD+AM ^d | 250 | 330 | 19 | — |
| S300GD+AZ ^d , S300GD+AM ^d | 300 | 380 | 18 | — |
| S350GD+AZ ^d , S350GD+AM ^d | 350 | 420 | 16 | — |
| S450GD+AZ ^d , S450GD+AM ^d | 450 | 480 | 15 | — |
| S550GD+AZ ^{e, f} , S550GD+AM ^{e, f} | 550 | 550 | — | 2 |

a 拉伸试验试样为纵向样。

b 屈服强度采用 $R_{p0.2}$ 。

c 当产品公称厚度不大于0.70mm时, 断后伸长率允许下降2个单位。

d 试样为GB/T228.1中的P6试样。

e 试样为GB/T 228.1中的P17 试样。

f 对于牌号为S550GD+AZ、S550GD+AM的产品, 当产品的厚度不大于0.7mm 时, 由于厚度减薄效应, 导致伸长率过低, 以致无法测得到屈服强度。此时, 屈服强度用抗拉强度代替。

a The tensile test specimen is a longitudinal sample.

b The yield strength is $R_{p0.2}$.

c When the nominal thickness of the product is not greater than 0.70mm, the elongation at break is allowed to decrease by 2 units.

d The sample is the P6 sample in GB/T228.1.

e The sample is the P17 sample in GB/T 228.1.

f For products with grades S550GD+AZ and S550GD+AM, when the thickness of the product is not greater than 0.7mm, the elongation rate is too low due to the thinning effect, making it impossible to measure the yield strength. At this moment, Replace yield strength with tensile strength.

3、钢板的不平度 / Flatness

单位 / Unit: mm

| 规定的最小 屈服强度 The minimal yield strength MPa | 公称宽度 Nominal width mm | 不平度 mm Flatness ≤ | | | | | | | | |
|---|-----------------------------|--------------------------------|------------------------|-------------------------------------|--------------------|------------------------|-------------------------------------|--------------------|------------------------|-------------------------------------|
| | | 公称厚度 mm Specified thickness | | | | | | | | |
| | | <0.70 | | | 0.70~<1.20 | | | ≥1.20 | | |
| | | 边浪 Edge wave | 中浪 Center buckle | 翘曲 ^a Bow ^a | 边浪 Edge wave | 中浪 Center buckle | 翘曲 ^a Bow ^a | 边浪 Edge wave | 中浪 Center buckle | 翘曲 ^a Bow ^a |
| <260 | 600~≤1200 | 5 | 5 | 8 | 4 | 4 | 7 | 4 | 4 | 6 |
| | >1200~1500 | 6 | 6 | 10 | 5 | 5 | 8 | 5 | 5 | 7 |
| | >1500 | 7 | 7 | 15 | 6 | 6 | 13 | 5 | 5 | 11 |
| 260~<360 | 600~≤1200 | 7 | 7 | 10 | 6 | 6 | 8 | 5 | 5 | 7 |
| | 1200~1500 | 8 | 8 | 13 | 7 | 7 | 11 | 6 | 6 | 9 |
| | >1500 | 11 | 11 | 17 | 10 | 10 | 15 | 9 | 9 | 13 |
| ≥360 | 600~≤1200 | 10 | 10 | 13 | 8 | 8 | 10 | 7 | 7 | 8 |
| | 1200~1500 | 12 | 12 | 16 | 10 | 10 | 13 | 8 | 8 | 11 |
| | >1500 | 14 | 14 | 21 | 12 | 12 | 19 | 10 | 10 | 17 |

^a 彩涂钢板带的翘曲仅指C翘, L翘不做要求。

^a The Bow of prepainted steel plate strips only refers to C-Bow, and L-Bow is not required.

注: 用户切条且未进行平整矫直时, 可能会导致钢板的板形变差。

Note: When the user cuts the strip without leveling and straightening it, it may result in poor deformation of the steel plate.

Introduction of Coatings

涂料介绍

组成 Composition

► 涂料的组成及其作用

各种不同的涂料，都有四个部分组成，即 (1) 树脂 (2) 颜料 (3) 溶剂 (4) 助剂。其中溶剂是挥发部分。

(1) 树脂

树脂即成膜物质，是涂料中的最主要成分和基础，也称基料，它是决定涂膜性质的主要因素。要求作为成膜物质的树脂在涂料储存期内相当稳定，不发生明显的物理变化和化学变化：在成膜时，在规定的条件下，能迅速固化成膜。

树脂种类繁多，在卷材涂料中常用的树脂有丙烯酸树脂、环氧树脂、聚酯树脂和聚氨酯等。不同的树脂，其物理性能和化学性能、以及耐候性、耐蚀性是不一样的。

(2) 颜料

颜料须与树脂配合使用，在涂料中的主要作用是使涂膜着色，颜料比例不同会影响涂膜硬度、光泽度以及耐蚀性等。



Prepainted Steel Sheets

**Prepainted
Steel Sheets**

(3) 溶剂

溶剂是液态涂料的重要组成部分，在涂料烘干过程中是能挥发的成分。一般也用溶剂调节涂料粘度，这种用于调节涂料粘度的溶剂称为稀释剂。溶剂对涂料的制造、贮存、涂敷、漆膜的形成和成膜质量有着很大的影响。

(4) 助剂

助剂是为改善涂料性能而加入的少量添加剂。助剂在涂料中用量极少，作用却显著，如有的能改进涂料和涂膜的性能，有的能改善烘干时间、有的能防止涂膜产生病态等。助剂种类繁多，有催干剂、固化剂、流平剂、消泡剂、消光剂、稳定剂等。

(3) Solvent

The solvent is an important component of liquid coating, which is volatile while baking the coating. Generally, the solvent is also used to adjust the viscosity of the coating, and the solvent of this kind is also called diluent. The solvent has important influences on the production, storage and application of coating, the formation of the membrane and the quality of the membrane formation.

(4) Additives

The accessory ingredient is a small amount of additive for improving the performance of coating. Although the dosage of the accessory ingredient is little in the coating, its function is remarkable. For instance, some of them can improve the performance of coating and that of the membrane, some can adjust the baking time, and some can prevent the membrane from morbidity. There is a great variety of the accessory ingredients, including siccative, curing agent, leveling agent, defoaming agent, flattening agent, stabilizing agent, etc.

► Composition and function of coatings

Every kind of coating consist of four kinds of ingredients, namely (1) resin, (2) pigment, (3) solvent, and (4) additives. Among them, the solvent is a kind of volatile organic compound.

(1) Resin

Resin, namely the membrane forming matter, is the principal component and base of coating, also called base material, and the vital factor determining the property of the membrane. It is required that, being a membrane forming matter, resin should be very stable without any obvious physical change or chemical change in the storage period of coating. Under the specified condition, it can should be quickly dried and congealed into a membrane within the period of membrane formation. There is a great variety of resin products, among which the commonly used ones in the coil coating consist of acrylic resin, epoxy, polyester resin, polyurethane, etc. Different resin has different physical & chemical characteristics as well as different properties in weatherproof, and corrosion resistance.

(2) Pigment

Pigment must match resin in coating, which mainly colors the membrane. Different proportion of pigment of the coating membrane has different rigidity, glossiness, and corrosion resistance, etc.



Introduction of Coatings

涂料介绍

分类 Classified



Prepainted Steel Sheets

| | |
|----|-------------------------|
| 用途 | 建筑涂料和家电涂料 |
| 结构 | 底漆、面漆 |
| 树脂 | 环氧、聚酯、硅改性聚酯、聚氨酯、聚偏二氟乙烯等 |
| 功能 | 自洁、抗静电、隔热等 |

| | |
|-----------|---|
| Usage | Coating for electrical household appliances |
| Structure | Primer, finish coating |
| Resin | Epoxy, polyester, silicon modified polyester, polyurethane, polyvinylidene fluoride, etc. |
| Function | Self-cleaning, antistatic, heat insulation, etc. |

Prepainted
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► 底漆种类和膜厚

底漆有环氧、聚酯、丙烯酸和聚氨酯等。

一般根据产品的用途、使用场合、加工程度，以及与面漆的配套来选择底漆。底漆的膜厚通常为 5-7um。

(1) 环氧底漆

与基材的附着力良好、耐水、耐碱、抗化学腐蚀性好，是最早的卷材用底漆，柔韧性能不如其它底漆。

(2) 聚酯底漆

对基材的附着力好、柔韧性优异、对潮湿的环境较敏感、耐化学药品不如环氧底漆。

(3) 水溶性丙烯酸底漆

对基材的附着力良好、很好的柔韧性、有机溶剂含量低、低温固化。

(4) 聚氨酯底漆

具有耐化学药品性、耐久性、柔韧性好。

► Category and film thickness of primers

The category of the primer includes epoxy, polyester, acrylic acid, polyurethane, etc.

In general, the primer is chosen in accordance with the usage, environment condition, processing stage and finish coat. The film thickness of the primer is usually 5-7 um.

(1) Epoxy primer

The epoxy primer has a strong adhesion to the base metal and good properties in waterproof, alkali-proof and chemical resistance, which is the original primer for the coiled steel, having a poorer flexibility than that of other primers.

(2) Polyester primer

The primer has strong adhesion to the base metal and excellent flexibility, which is relatively sensitive to damp environment and has a chemical resistance poorer than that of epoxy primer.

(3) Water-soluble acrylic acid primer

The primer of this kind has strong adhesion, excellent flexibility, lower organic solvent and low-temperature curing.

(4) Polyurethane primer

The primer of this kind has excellent chemical resistance, durability and flexibility.



Introduction of Coatings

涂料介绍

面漆种类及特点

Category and Characteristics of Finish Coats



Prepainted Steel Sheets

面漆种类

在卷钢涂料中，起耐久性作用的是树脂和颜料，最常用的面漆有聚酯、硅改性聚酯、高耐久性聚酯和聚偏二氟乙烯等。

(1) 聚酯

附着力良好、颜色丰富、在成型性和室外耐久性方面范围较宽、耐化学药品性中等、成本低。

(2) 硅改性聚酯

涂膜的硬度、耐磨性和耐热性良好；以及良好的外部耐久性和抗粉化性、光泽保持性，柔韧性一般、成本中等。

(3) 高耐久性聚酯

优良的颜色保持性和抗紫外线性能、优良的室外耐久性和抗粉化性、漆膜附着力好，颜色丰富、优异的性价比。

(4) 聚偏二氟乙烯

优异的颜色保持性和抗紫外线性能、优异的室外耐久性和抗粉化性、优良的抗溶剂性、良好的成型性、抗脏性、颜色有限、成本高。

**Prepainted
Steel Sheets**



► Category of finish coats

Among all the ingredients of coil coatings, resin and pigment have the function of duration, and the primers commonly used consist of polyester, silicon modified polyester, polyvinylidene fluoride, high durability polyurethane, etc.

(1) Polyester

The finish coat of this kind has strong adhesive force, a variety of colors, wide scope of properties in formation and durability outdoors, moderate chemical resistance and low cost.

(2) Silicon modified polyesters

The membrane of the finish coat of this kind has excellent rigidity, abrasion resistance, thermal resistance, good outside durability, chalking resistance, high retention of color and luster, ordinary flexibility, moderate cost, etc.

(3) High-durability polyester

The finish coat of this kind has excellent retention of color, resistance of ultra-violet radiation, strong outdoors durability, chalking resistance, strong adhesion to the base metal, plenty of colors and relatively lower cost compared to the same quality.

(4) Polyvinylidene fluoride

The finish coat of this kind features in its excellent retention of color, resistance of ultra-violet radiation, outdoors durability, chalking resistance, resistance to solvent, formability, good dirt resistance, finite colors and high cost.



涂层性能

Performance of Coating Film

1、宝钢彩涂板正面常规性能 (下表供参考, 以订货标准为准)

Common performance of front coating of baosteel's prepainted steel sheet

| 面漆种类 Category | 涂层厚度 Thickness (μm) | 铅笔硬度 Pencil hardness | 180°弯曲 ^a 180°bend ^a | | 反向冲击 Impact (J) | 耐中性盐雾 Salt pray resistance ^b | 紫外灯 加速老化 Aging ^c | | | |
|-----------------------------|---------------------------|----------------------------|--|---------------|-----------------------|---|-----------------------------------|-----------------|-----------------|-----------------|
| | | | 厚度≤0.75mm (钢窗料厚度≤0.80mm) Thickness ≤0.75mm (Thickness of steel materials for door and window ≤0.80mm) | | | | 试验时间 Time(h) | | 失色 ^e | 失光 ^e |
| | | | A级 A level | B级 B level | | 试验时间 Time(h) | UVA - 340 | UVB - 313 | | |
| | | | | | | | | | | |
| 聚酯PE ^d | ≥20 | ≥F | ≤4T | ≤3T | ≥9 | ≥1000 | ≥600 | ≥400 | ≤4级 | - |
| 硅改性聚酯 SMP | ≥20 | ≥F | ≤4T | ≤3T | ≥9 | ≥1000 | ≥720 | ≥480 | ≤4级 | - |
| 高耐久性聚酯 HDP | ≥22 | ≥HB | ≤4T | ≤3T | ≥9 | ≥1500 | ≥960 | ≥600 | ≤3级 | ≤3级 |
| 聚偏二氟乙烯 PVDF ^f | ≥23 | ≥HB | ≤4T | ≤2T | ≥9 | ≥2000 | ≥1800 | ≥1000 | ≤2级 | ≤2级 |

a 厚度 $>0.75\text{mm}$ (或钢窗料厚度 $>0.80\text{mm}$)的钢板及钢带做90°弯曲; 试样方向为纵向。

b 试样为平板试样并进行封边处理。

c UVA-340采用12小时为1循环周期: 8h紫外光照, 黑板温度 $60^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 4h冷凝, 黑板温度 $50^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 。UVB-313采用8小时为1循环周期: 4h紫外光照, 黑板温度 $60^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 4h冷凝, 黑板温度 $50^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 。

d 用户如有要求, 可规定铅笔硬度为HB。

e 功能型涂层的失光和失色允许放宽一个等级。

f 涂层厚度 $\geq 30\mu\text{m}$ 时, 铅笔硬度要求为B。

a If the thickness $>0.75\text{mm}$ (thickness of steel materials for door and window $>0.80\text{mm}$), the steel sheet or coil should be curved by 90° .

And the samples are shaped with a transverse directions.

b The samples are edge sealed plates.

c UVA-340 method: a time cycle of 12 hours, 8 hours' exposure to the UV light, black board temperature $60^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 4hours' condensation, black board temperature $50^{\circ}\text{C} \pm 3^{\circ}\text{C}$. UVB-313: a time cycle of 8 hours, 4 hours' exposure to the UV light, black board temperature $60^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 4hours' condensation, black board temperature $50^{\circ}\text{C} \pm 3^{\circ}\text{C}$.

d The pencil hardness could be available on HB as the customer's requirement.

e Deterioration of color and gloss for functional coat is permitted with the extension of one more class.

f Pencil hardness is B on coat with thickness not less than $30\mu\text{m}$.

2、宝钢不同背面涂层结构的性能比较（控制值）

Performance Comparison for Different Back Coating Structures of Baosteel (Controlling Value)

| 背面涂层结构 Coating structure | 2/1 | 2/1M | 2/2 |
|-----------------------------|----------------------|---|---|
| 涂层数 / Coating layer | 1 | 2 | 2 |
| 涂层厚度 / Coating thickness | $\geq 5\mu\text{m}$ | $\geq 8\mu\text{m}$ | $\geq 12\mu\text{m}$ |
| 铅笔硬度 / Pencil hardness | - | $\geq \text{F}$ | $\geq \text{F}$ |
| 反向冲击 / Reverse Impact | - | $\geq 9\text{J}$ | $\geq 9\text{J}$ |
| 柔韧性 / Flexibility | - | $\leq 5\text{T}$ | $\leq 5\text{T}$ |
| 用途 / Application | 夹芯板 / Sandwich sheet | 夹芯板、单层压型板 Sandwich sheet, Single layer panel | 背面非粘结 Non adhesive application on the back |

Introduction of Products

彩涂产品介绍

高耐久性聚酯 (HDP)

High-Durability Polyester

► HDP 涂料耐久性好的原理

- (1) 树脂：HDP 采用高分子量的树脂，聚合物支链少，键能稳定，不易光解，因此不易粉化和光泽降低。
- (2) 颜料：HDP 采用无机陶瓷颜料，在日光中不易褪色。
宝钢高耐久性聚酯的供应商为世界上最早的也是最大的涂料公司之一，中国境内提供 15 年涂层质量保证。



Prepainted Steel Sheets

**Prepainted
Steel Sheets**



► **Reasons why HDP has longer durability**

- (1) Resin: HDP adopts the high molecular weight resin with little branched chain polymer, stable bond energy and resistance to photolysis, so HDP has a relatively good resistance to chalking and excellent retention of luster.
- (2) Pigment: HDP adopts inorganic ceramic pigments, which makes it hard to fade in the sunlight.

The supplier, one of the earliest and largest coating enterprises in the world, who provides Baosteel with high-durability polyester (HDP), *offers a quality guarantee of their coating products for 15 years* in china.

Introduction of Products

彩涂产品介绍

聚偏二氟乙烯 (PVDF)

Polyvinylidene Fluoride

涂料性能

该产品积累了三十多年的生产技术经验，涂料采用专利配方，Kynar 500 或 Hylar 5000，无机陶瓷颜料，每一种新的原料都必须经过佛罗里达十年曝晒证明才能商业使用，从而使产品质量得到可靠保证。美国 Fitzpatrick 核电站厂房彩板采用热镀锌基板，涂上含 70% 树脂的氟碳涂料。1971 年建成至今不仅表面及基板完好，而且色彩依旧。

宝钢氟碳涂料的供应商为世界上最早的也是最大的氟碳涂料公司之一，中国境内**提供 20 年涂层质量保证**。



Prepainted Steel Sheets

► 氟碳彩板的用途

PVDF 氟碳涂层为现有建筑涂层中的极品，为公认的具有最好保护作用的有机涂层，能保证金属建筑板几十年不受损害，并始终保持美丽的颜色。从 1965 年进入市场起，氟碳涂层在世界各地的建筑物经历了 30 多年的日晒风吹雨打，始终保持完美无损。PVDF 为聚偏二氟乙烯。氟原子最大的电负性能形成十分稳固的氟碳键，加上其分子独特的对称性，使 PVDF 具有超常的稳定性，独特的抗紫外光光解性能及优异的绝缘性能和机械性能。

**Prepainted
Steel Sheets**

► **Usage of fluorocarbon prepainted sheet**

The PVDF fluorocarbon coating is a masterwork among the existing construction coatings, which is generally acknowledged as an organic coating with the best protective performance, guarantees the metal building board not to be damaged for decades and always retains its beautiful color. Since entering the market in 1965, the fluorocarbon coatings world-widely applied to buildings have already successfully traveled through various poor weathers and still remained perfect in the past 30 years. PVDF denotes polyvinylidene fluoride. The fluorine-carbon bond formed by a fluorine atom with the largest electronegativity, together with its unique symmetry of molecule, lets the PVDF has an extra stability, unique resistance to photolysis of ultra-violet radiation, excellent insulation and mechanical properties.

► **Performance of coating**

Baosteel has already accumulated more than 30 years' technical & production experience of the coatings of this kind. The coating adopts some patented recipes, Kynar 500 or Hylar 5000, and inorganic ceramic pigment, and each kind of new materials must be put into commercial uses upon Florida's ten-year insolation certificate, which guarantees the product quality. The prepainted steel sheet for the workshop of Fitzpartick Nuclear Power Plant of the U.S.A. adopts the hot-dip zinc coated base metal that is coated with the fluorocarbon coating with 70% resin content. Since the workshop was built in 1971, while not only the surface and the base metal of the prepainted steel sheet are still perfect, but also its color is retained well.

涂料曝晒后表面比较 (放大 1000 倍)

Comparison of coating surface after insolation (enlarge by 1000 times)

佛罗里达 45 度角向南

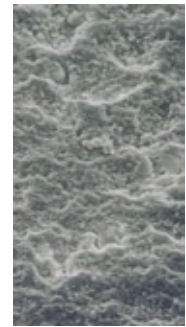
Florida: in the south by an angle of 45 degree



PVDF 氟碳 13 年
PVDF fluorocarbon:
13 years



SMP 硅改性聚酯 9 年
SMP silicon modified
polyester: 9 years



PE 聚酯 6 年
PE polyester:
6 years

The supplier, one of the earliest and largest coating enterprises in the world, who provides Baosteel with PVDF, **offers a quality guarantee of their coating products for 20 years** in china.

Introduction of Products

彩涂产品介绍



Prepainted Steel Sheets

彩涂印花钢板

定义：

彩涂印花钢板也称印刷钢板，是在钢板上涂一层油漆烘烤后，用照像凹版技术印刷出图案，再涂上透明漆经烘烤而成之产品。

图纹：

图纹一般是木纹状的，用户若有特殊要求，可另行协商研制。

用途：

主要用作内外墙壁及室内物品装饰。

金属压花彩涂钢板

定义：

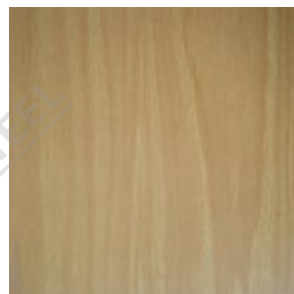
金属压花彩涂钢板是在钢板彩涂之后，进行压花处理使彩涂钢板被压出凹凸花纹的产品。

用途：

金属压花彩涂钢板因具有优良立体感，广泛应用于室内装饰面板等用途。

可供规格：

金属压花彩涂钢板不受涂层品种限制，但因使金属变形较为困难，故基板厚度一般不超过 0.60mm。



印花钢板



压花钢板

家电环保彩涂板

定义:

通过对镀层, 预处理和涂料中有害元素(铅、镉、六价铬等)的控制及合适的环保彩涂产品生产工艺, 生产符合欧洲 RoHS 指令的家电用彩涂钢板。

基板种类:

电镀锌基板、热镀锌基板、冷轧基板。

钢种:

普通、冲压、深冲压

涂层结构:

2/1、2/2、2/1M

颜色:

普通素色、金属色、珠光色

用途:

冰箱侧板、空调室内机侧板、空调室外机面板, 洗衣机箱体, 冰柜箱体、DVD 上盖板、微波炉箱体, 热水器外壳、灯罩等

Color-coated Printed Steel Sheet

Definition:

Color-coated printed steel sheet, also called printed sheet, is prepared by being coated with a layer of paint and baked pattern is printed out using the gravure technologies, then a layer of clear lacquer is coated and after being baked again, color-coated printed steel sheet is obtained.

Patterns:

Patterns are typical wood texture (as shown in the figure). Special requirements from customers may be met via negotiation and research otherwise.

Application:

Mainly applied to decoration for interior and exterior walls and indoor items.

Metal Embossed Color-coated Steel Sheet

Definition:

Metal embossed color-coated steel sheet is the product prepared via being color-coated and applied to produce embossed patterns on color-coated steel sheet.

Application:

Metal embossed color-coated steel sheet is extensively applied as indoor decoration panels because of its good stereoscopic impression.

Provided specification:

Metal embossed color-coated steel sheet is not limited by coating types. But the substrate thickness is normally no more than 0.60mm as it may make the metal hard to deform.

Environmental Friendly Home Appliance Color-coated Sheet

Definition:

To produce the home appliance color-coated steel sheet in accordance with European RoHS Directive by controlling hard elements (lead, cadmium, hexavalent chrome) in plated layer, pre-treatment and coating and adopting proper environmental friendly production processes for color-coated products.

Substrate type:

Electro-galvanized substrate, hot dip galvanized substrate, cold rolling substrate.

Steel type:

Normal, drawing, deep drawing.

Coating structure:

2/1, 2/2, 2/1M.

Color:

Normal solid color, metal color, pearlescent color.

Application:

Refrigerator side sheet, indoor air conditioner side sheet, outdoor air conditioner panel, washing machine cabinet, freezer cabinet, DVD upper cover, microwave oven cabinet, water heater case, lamp cover, etc.

Introduction to the Functional Coat

功能涂料介绍

自洁 Self-cleaning



Prepainted Steel Sheets

▶ 1、什么让彩板变脏了？

天晴时空气中的污染物以及下雨时雨水中的污染物都会残留在墙面或屋顶彩板涂层的表面，形成图 1 的景象。根据污染物特性和使用环境污染物分为城市型和郊区型。

城市型：汽车尾气、工业粉尘颗粒等。

郊区型：尘土。

▶ 2、何为自洁彩板？

自洁彩板是一种新型的户外建筑用彩涂钢板。它的有机涂层除了具有普通彩板的高装饰性及耐候性外，还具有特殊的自清洁功能。采用这种材料制成的厂房不需要人工清洗维护，只借助于雨水的冲刷就能在空气质量较差的工业和城市地区保持屋顶和墙面彩板的外观鲜艳性，保持彩色涂层的高装饰性。

▶ 3、不同涂层体系的沾灰及可清洁性

氟碳涂料：中低等的沾灰程度，具有很好的可清洁性。

普通聚酯体系：高的沾灰程度，不易清洁。

宝钢目前自洁板：中高的沾灰程度，易清洁。

▶ 4、宝钢自洁彩板

具有优异的抗沾污性能，能抵抗污染物渗透到漆膜内。优异的亲水性能保证了雨水充分展开于涂层表面，起到良好的冲刷效果。宝钢自洁 HDP 和 PVDF 在中国境内提供 5 年自清洁性能的质量保证。

**Prepainted
Steel Sheets**

► **1. Why does the prepainted steel sheet become dirt?**

The pollutants produced either in a sunny day or in a rainy day may rest on the surfaces of the prepainted steel sheets applied to wall finishes or roofs, which is showed in Figure 1.

The pollutants can be classified into two groups, namely urban pollutants and suburban ones, according to the characteristics of pollution and environment.

Urban Pollutants: auto exhaust gas, industrial dust and fog, etc.

Suburban: dust.

► **2. What's the self-cleaning prepainted steel sheet?**

The self-cleaning prepainted steel sheet is a new prepainted steel sheet for outdoors construction. Its organic coating not only has excellent properties of decoration and weatherproof that common prepainted steel sheets might possess but also has the special self-cleaning function. The factory buildings built by the prepainted steel sheets of this kind needn't any manually-operated cleaning or maintenance, which can retain the cleanness and glossiness of the prepainted steel sheets applied to the walls and roofs only by rainwater, even those in the industries and cities with poorer air quality, and can maintain the high decorative property of the prepainted steel sheets.

► **3. Different coating system might have different contamination and cleaning property**

Fluorocarbon coating: at the medium and low contamination level, and easy to clean.

common polyester system: at high contamination level, and hard to clean.

Self-cleaning sheet: at medium and high contamination level, easy to clean.

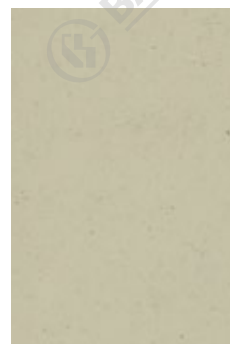
► **4. Baosteel's self-cleaning prepainted steel sheet**

Has excellent resistance to staining, which can prevent the pollutants from being penetrated into the coating membrane. Its good water solubility ensures that the rainwater can fully cover the surface of the coating and cleanse the surface well. Baosteel's self-cleaning HDP and PVDF prepainted steel sheet provide 5-year quality assurance of self-cleaning performance in china.

下图为普通涂层与自洁涂层对比情况
Comparison of common coating & self-cleaning coating



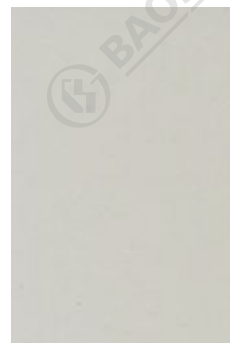
普通彩板挂片半年后的
实物
Actual view of common
prepainted steel sheets
applied after half a year



自洁彩板挂片半年后的
实物
Actual view of Baosteel's
self-cleaning prepainted
steel sheets applied after
half a year



普通彩板
Common prepainted
steel sheets

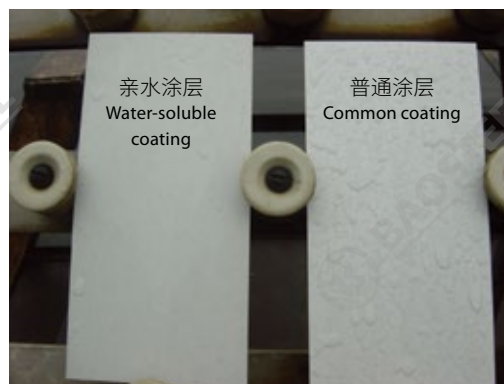


宝钢自洁彩板
Baosteel's self-cleaning
prepainted steel sheet

图 1：白灰墙面彩板使用一年后的表面污染情况



Figure 1: One year after the prepainted steel sheet is
applied to the lime wall finish



亲水涂层与普通涂层对比
Comparison of Water-soluble coating & common coating

Introduction to the Functional Coat

功能涂料介绍

隔热 Adiabatic Products



Prepainted Steel Sheets

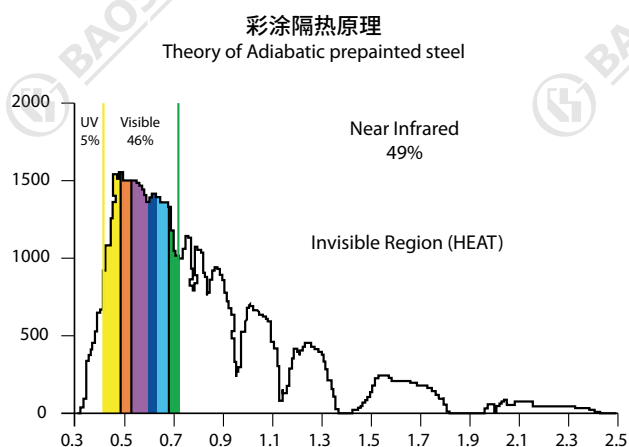
隔热彩板又称冷屋顶板（Cool Roof 中的一种）指借助于板面的反射将太阳照射的部分热量反射回大气中，从而阻隔建筑物室外热量向室内传递，降低室内温度的一种新型功能彩板。其功能的实现主要由面漆涂层性能的革新而获得。

通过面漆的颜料及填料的改进，面漆涂层对日光照射能量的反射会比普通彩板有所增强，从而降低建筑物室内温度，提高热舒适性，减少空调的使用，降低使用成本，间接的也可以减轻能源的利用，减少热岛效应等。

**Prepainted
Steel Sheets**

Adiabatic prepainted steel also known as the cool roof means a superior kind of prepainted steel that decreases the temperature in the house by reflecting the sunlight to the air to decrease the thermal conduct into the interior space. The development of function mainly attributes to the revolution of the paint system.

The reflection are enhanced by reformation of pigments and additives. The decline of temperature contributes to the more comfortable life and less frequency use of air conditions. The cost will be reduced by higher efficient utility of energy, since the Heat-island Effect is weakened.



Introduction to the Functional Coat

功能涂料介绍

抗静电 Antistatic

抗静电用彩涂板

1、静电的产生

不同物质的分子、原子以及对电子的相互吸引作用不同瞬间就能产生电荷，这种电荷称之为静电荷。即使很小的静电荷也能产生极高的静电电压。一般来说，极性基团较多的聚合物容易携带正电荷，反之则容易携带负电荷。

在日常生活中到处都有产生静电的现象。如：人在空调房间走过合成地毯时能产生超过 1000 伏特的电荷积累；在冬天穿脱衣服和汽车开门时会产生手被电击的感觉。

导体和半导体表面也会产生静电现象，但是由于电荷能在表面和材料内部传递，因此不会在表面产生静电荷的积累。而彩涂产品表面的聚酯或氟碳是高分子聚合物，属绝缘材料，一旦带上电荷则很难去除。

2、静电的危害

- (1) 吸附灰尘和细菌
- (2) 降低产品的表面及使用性能
- (3) 引起静电放电会造成燃烧或爆炸



Prepainted Steel Sheets

**Prepainted
Steel Sheets**

▶ 3、抗静电彩涂板的工作原理

抗静电彩涂板的抗静电原理是在绝缘的聚酯涂层中加入导电性材料，使原来绝缘的涂层变成半导体，配合建筑工程的接地线的安装，可使彩涂钢板表面因空气对流及衣物摩擦而产生的静电得以导入大地而消失。

▶ 4、抗静电彩涂板的用途

主要用在抗静电、高清洁度无尘、无菌场所。如：电子半导体业、食品加工业，制药业、医院等。

▶ 5、抗静电彩涂板的性能

- (1) 加工性和耐久性能和普通聚酯相当。
- (2) 耐化学药品性及耐溶剂性略高于普通聚酯。
- (3) 表面电阻 (Ω/cm^2) 为 10^6 - $10^9\Omega$, (普通聚酯在 $10^{13}\Omega$ 左右)。

Antistatic prepainted steel sheet

▶ 1: Source and danger of static electricity

The electric charge may be generated instantaneously when different molecules and atoms are absorbing one another and interacting, which is also called static charge. Even very small static charge can generate a high static voltage. Generally speaking, the polymer with many polar groups is apt to carry positive charge; otherwise, it is apt to carry negative charge.

In our daily life, the static there are various static phenomena. For example, a voltage over 1000 volt may produce while a man is walking on the composite carpet in an air conditioning room, and our hand always feel an electric shock while we are taking off in winter, or opening doors of the auto car.

The surface of both conductor and semiconductor may also generate static electricity; however, because the accumulated charge can be conducted by the surface and the internal of materials, there is little static charge accumulated there. While the polyester or fluorocarbon on the surface of the prepainted steel sheet is a kind of high molecule polymer, which is an insulating material. However, as long as the surface generates electric charge, it may be really hard to discharge.

▶ 2: The danger of accumulation of static charge on the surface:

- (1) Adsorbing dust and bacteria.
- (2) Damage the performance and usage of the surface of the product.
- (3) Cause the static electricity discharged, which may bring about fire disaster or explosion.

▶ 3: Working principle of the antistatic prepainted steel sheet

The working principle of the antistatic prepainted steel sheet is to add some conducting materials in the insulating polyester coating, which gets the former insulated coating, become a semiconductor. Being assorted with the earthing system of the construction, the accumulated static electricity on the surface of the prepainted steel sheet that is sourced from air convection or fabric friction is conducted into the earthing system and then disappears.

▶ 4: Usage of the antistatic prepainted steel sheet

Mainly used in antistatic, high cleanness and bacteria-free environments, covering: electronic semi-conductor industry, foodstuff processing industry, pharmaceutical industry, hospitals, etc.

▶ 5: Performance of the antistatic prepainted steel sheet

- (1) Its machining property and durability match that of the prepainted steel sheet with common polyester as its base metal.
- (2) Its resistance to chemicals and solvents is slightly higher than that of the common polyester prepainted steel sheet.
- (3) Its surface resistance(Ω/cm^2) is 10^6 - $10^9\Omega$ (common polyester prepainted steel sheet: about $10^{13}\Omega$).



Introduction to the Functional Coat

功能涂料介绍

抗菌 Antisepitc

抗菌彩涂板

► 定义：

抗菌即先控制微生物的活动和繁殖，创造一个清洁环境，并将其逐步杀灭的一种长期杀菌作用；以生活环境中生息的细菌为对象，抗菌效果可续数年以上，长期保持生活环境的（微生物学）卫生性。

► 机理：

金属离子溶出型的抗菌机理，在使用过程中抗菌剂缓慢释放出金属离子，溶出的金属离子即能破坏细菌的细胞膜或细胞原生质活性酶的活性，而具有抗菌效果。

抗菌彩涂板一般采用无机类抗菌剂，使用复合的金属离子溶出型和活性氧的抗菌剂，达到长效和广谱抗菌的要求，低毒性和高效快速。

► 用途：

用于医院墙面、天花板、食品储藏加工区域、通风系统等。



Prepainted Steel Sheets

**Prepainted
Steel Sheets**

Antiseptic Color-coated Sheet

► **Definition:**

Antisepsis is a long period germicidal action to control the activity and propagation of microorganisms to create a clean environment and then gradually kill all these microorganisms. As for bacteria growing in the living environment, the antiseptic effects may continue for more than several years and maintain long period (microbiology) hygiene for living environment.

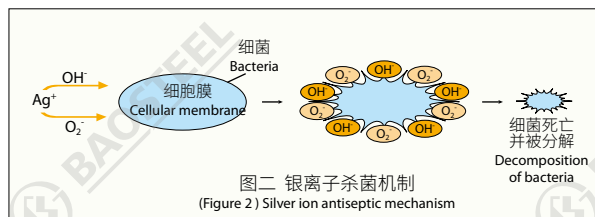
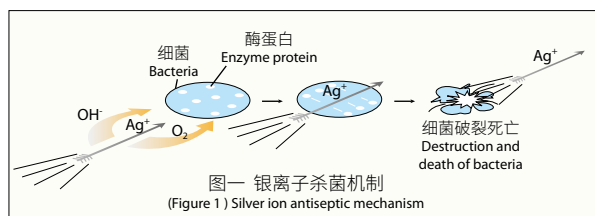
► **Mechanisms:**

Stripped metal ion antiseptic mechanism. Antiseptic agent slowly releases metal ions in application. Stripped metal ion can destroy the cell membrane of bacteria or activity of cellular protoplasm active enzyme, so it has antiseptic effects.

Antiseptic color-coated sheet normally adopts the inorganic antiseptic agent. To meet the requirements for long acting and board spectrum antisepsis, low toxicity and high efficiency and quick speed, the antiseptic agent combining stripped metal ions and active oxygen are used.

► **Application:**

Used for hospital wall face, ceiling, food storing and processing area, ventilating system, etc.



Introduction to the
Functional Coat

功能涂料介绍

抗菌抗病毒洁白®彩涂板
Prepainted HYGISTEEL® sheet with
antibacterial and antiviral white coat



Prepainted Steel Sheets

洁净室是空气悬浮粒子浓度受控的房间。它的建造和使用减少室内诱入、产生及滞留的粒子、室内其他相关参数如温度、湿度、压力等按要求进行控制。主要应用领域在集成电路、芯片、生物医药领域。分类：工业洁净室、生物洁净室。宝钢最新开发了抗菌抗病毒洁白®彩涂板。

1、洁白®比白灰更白



洁白®
HYGISTEEL®



白灰
white gray

Prepainted
Steel Sheets

| 颜色名称 Color name | L | a | b |
|--------------------|-------|-------|-------|
| 白灰 White gray | 81.83 | -0.59 | 3.18 |
| 洁白® HYGISTEEL® | 87.24 | -1.23 | -0.75 |

备注：色差值供参考，以最新宝钢标准板和测试为准。
Remarks: The color difference values are for reference, subject to the latest Baosteel's standard plate and testing result.

2、洁白®光泽比白灰更低

室内照明较多，高光带来的眩光，容易引起视觉疲劳。低光泽表面漫反射性好，视觉舒适同时，低光泽可增强涂层抗划擦性。洁白®比白灰光泽控制目标值低 15 个单位。
注：一般内墙乳胶漆为光泽小于等于 5。

► 3、超高校形

宝钢在现有彩涂产品全部高不平整度精度供货的基础上，宝钢针对洁净室开发了超高校形产品，通过专用 APN O243 和 O233 进行订货。

板形需求采用用途代码管理；采用特殊钢种，强度均匀。

► 4、抗病毒机理

某些特殊抗病毒因子可以使各种蛋白失活，从而起到杀灭病毒的作用，并且没有选择性，同时也能杀灭细菌。主要通过抗病毒因子与蛋白肽键上的酰胺键和巯基的络合作用。

A clean room is a room in which the concentration of airborne suspended particles is controlled. It can reduce the particles induced, generated and detained in the room, and other relevant indoor parameters such as temperature, humidity, pressure, etc. can be controlled according to the requirements. The main application fields are integrated circuits, chips and biomedicine. Classification: industrial clean room, biological clean room. Baosteel has recently developed Prepainted HYGISTEEL® sheet with antibacterial and antiviral white coat.

► 1: HYGISTEEL® is whiter than white gray

► 2: Lower gloss

More indoor lighting and glare caused by high light are easy to cause visual fatigue. The low gloss surface provides good diffuse reflectance and visual comfort. At the same time, the low gloss can enhance the scratch resistance of the organic coat. The white HYGISTEEL® is 15 units lower than the common white gray on aiming value.

Note: generally, the gloss of interior wall emulsion paint is less than or equal to 5.

► 3: Super flatness

Baosteel has developed ultra-high profile products for clean rooms on the basis of high flatness precision supply of all existing prepainted products, which are ordered through special APN O243 and O233.

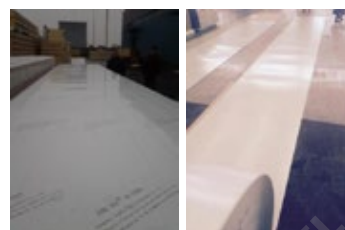
The shape requirement is managed by the APN; Special steel grade is adopted with uniform strength.

► 4: Antiviral mechanism

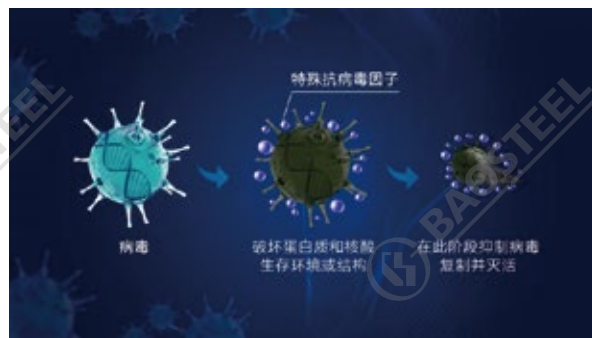
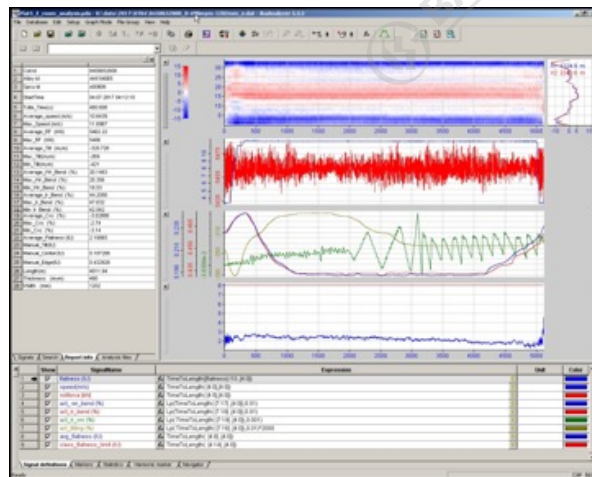
Some special antiviral factors can inactivate all kinds of proteins, so as to play the role of killing the virus, and there is no selectivity. It also can kill bacteria. It is mainly through the complexation of antiviral factors with amide bond and sulfhydryl group of protein peptide bond.



测量 O243 用途产品板形
Test on the flatness of O243
product



钢板中浪造成夹芯板表面不平整
waves of a sandwich panel caused by center
wave of steel sheet



Introduction of New Products

新产品介绍

先进高强基板彩涂

Advanced Prepainted Steel
with High-strength Substrate



Prepainted Steel Sheets

近年来，国内外彩色涂层钢板市场对高强、高韧、具有良好成型性能的彩色涂层钢板产品需求显著提高，同时对成本控制要求也不断增加。对此，宝钢成功开发出具有高强、高韧先进高强钢彩色涂层钢板产品，主要利用相变强化的原理，可在不增加或少增加成本的前提下，获得具有高强、高韧特性、加工成型性能和板型良好的先进高强彩色涂层钢板产品，更好地满足了用户对不同钢种性能的要求。

Considering a prominent boosted demand for prepainted steel at lower cost with high strength, high ductility and brilliant formation, Baosteel has succeeded in developing the products as the market requires. The principle of phase transition is utilized to acquire the advanced products with high strength, high ductility, brilliant formation and minimal flatness, which satisfy the customers' requirements on distinctive characteristics of steel.

| 牌号 Steel grade | 规格 Dimensions mm | 屈服 Yield strength MPa | 抗拉 Tensile strength MPa | 延伸率 Ratio of elongation |
|---------------------|------------------------|-----------------------------|-------------------------------|----------------------------|
| THC500/550CPD+AZ/AM | 0.45~1.0* 800~1250 | ≥500 | ≥550 | ≥10% |

THC500/550 CPD+AZ 经宝钢用户辊压成型后，比传统的 550 强度基板彩涂大幅提高抗风揭能力。

The performance of wind uplift resistance is significantly promoted after the rolling by Baosteel's customers comparing to the traditional 550.

Introduction of New Products

新产品介绍

超厚涂层彩涂
Super Thick Coated
Prepainted Steel



Prepainted Steel Sheets

彩涂钢板涂层厚度一般指钢板上表面涂层厚度，是包括底漆和面漆的总厚度。一般情况下，上表面涂层厚度在 20-25 微米。为了提高涂层对镀层和钢板的保护能力，可以采用增加涂层厚度的方法。

为此，宝钢推出了厚涂层彩涂钢板系列，主要包括：厚底漆二涂层氟碳彩涂钢板、三涂层珠光氟碳彩涂钢板、超厚双面氟碳彩涂钢板、厚涂层聚氨酯彩涂钢板、厚底漆聚酯系列彩涂钢板等。

针对不同厚度和涂层的彩涂板，宝钢进行了系列测试，参考数据如下，供货保证值按照相应订货标准。

图 1 是不同涂层盐雾试验中划线扩蚀程度的比较情况，从图中可以看出，3000 小时的盐雾试验中，与普通厚度的聚酯和高耐候聚酯相比，氟碳涂层钢板划线部位扩蚀宽度变化最缓慢，也就是说不同涂层中，氟碳涂层耐蚀性最为优秀，且随着涂层厚度的增加，耐蚀性更加优异。

由于有超厚的氟碳的涂层，因此耐候性也是非常优异的，图 2 为不同品种和膜厚彩涂钢板经过 3000 小时 QUVB 试验后失光率的对比，从图中可以看出，氟碳产品的失光率远远低于普通聚酯（PE）；上表面总膜厚为 23 微米氟碳和 45 微米氟碳钢板由于氟碳膜厚均为 20 微米左右，因此失光率基本一致，而上表面总膜厚为 62 微米的氟碳钢板，氟碳涂层的总厚度超过 35 微米，在失光率上也是最优的，且 62 微米氟碳产品粉化等级仍保持在最优 0 级。

宝钢新推出的厚涂层系列：厚底漆二涂层氟碳彩涂钢板（厚底漆氟碳）、三涂层珠光氟碳彩涂钢板（三涂层氟碳）、超厚双面氟碳彩涂钢板（超厚双面氟碳）、厚涂层聚氨酯彩涂钢板（厚涂聚氨酯）、厚底漆聚酯系列彩涂钢板等，在耐候性和耐蚀性上是存在差异的，为了便于大家理解和推广，请见图 3 示出的各品种比较示意图。我们可以根据建筑物所处内外环境，建筑物寿命等推荐合适的涂层钢板。

**Prepainted
Steel Sheets**

The coat thickness of the prepainted steel mainly means the top thickness including the top paint and the primer. Usually, 20-25 micron paint are applied on the top. For the acquisition of better protection to the alloy coat and the metal underneath, it is a brilliant way to increase the thickness of organic coat.

Baosteel develop series of prepainted steel products with super thick coat. They are 2 lays PVDF, 3 lays PVDF with pearly-lustre, super thick PVDF on both sides, super thick PU, PE with thick primer.

Baosteel has conducted a series of tests on prepainted steel with different thicknesses and coatings. The reference data is as follows. The contract guarantee value shall be in accordance with the corresponding ordering standards.

The demonstration of diagram compare the results on the scratch corrosion of different types of prepainted steel in the salt spray. It indicates that scratch of PVDF stretches most slowly during the 3000 hours' experiment comparing to the PE and HDP with regular thickness. Then we come to a conclusion that PVDF take the priority place in the corrosion resistance. And the performance get better when the coat thickness increases.

The weatherability of the super thick PVDF turn out to be appreciably excellent. The gloss loss of prepainted steel with different type and thickness after 3000 hours' QUVB is listed in the Figure 2. The gloss loss of PVDF perform apparently lower than the PE. The prepainted steel with the top thickness of 23 micron and 45 micron are similar in the gloss loss due to the similar mass of fluorocarbon. The PVDF with the thickness of 62 micron results in level 0, which is the best performance in the evaluation standard. The gloss loss of the prepainted steel with the thickness of 62 and 35 micron are the most excellent ones.

The series of thick prepainted steel: 2 layers PVDF with thick primer (thick primer PVDF), 3 layers PVDF with pearly-lustre (3 layer PVDF), super thick PVDF on both sides (super thick PVDF on both sides), super thick PU (thick PU), PE with thick primer, etc. We illustrate the concepts of different types shown as the Figure 3. And Baosteel are willing to recommend the suitable products to customers on the consideration of the building locations and the designs of service period.

图 1 不同涂料品种和膜厚在盐雾试验中划线扩蚀趋势

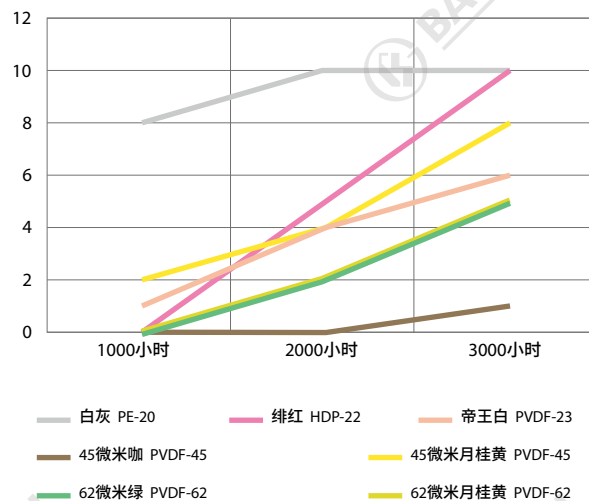


图 2 不同品种和膜厚彩涂钢板 QUVB 试验 3000 小时后失光率对比

The gloss loss of products with different types and thicknesses after the 3000 hours' QUVB

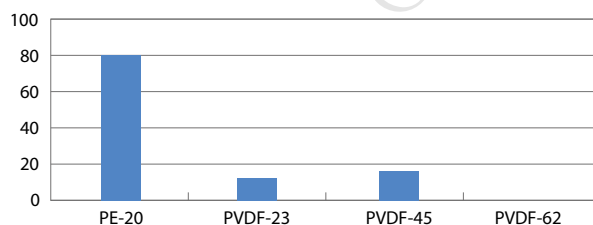
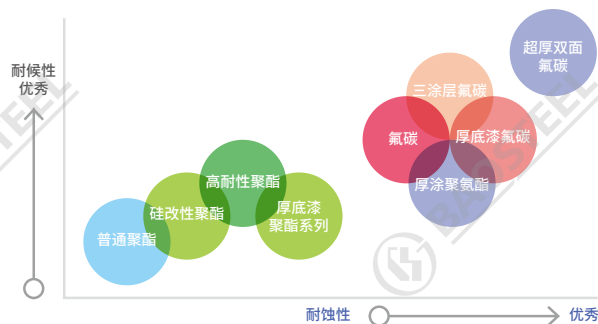


图 3 各涂层品种耐候性和耐蚀性比较示意图

The contrast of weatherability and corrosive resistances on different coat types



Introduction of New Products

新产品介绍

低铝锌铝镁基板彩涂 /
中铝锌铝镁基板彩涂 /
高铝锌铝镁基板彩涂

Prepainted steel with substrate
of Hot-dip zinc-magnesium/
zinc-aluminium-magnesium/
aluminum-zinc-magnesium
alloy coated steel sheet

为什么加镁？

最大的优点是耐蚀性，公开的实验室加速实验、户外暴露实验等结果表明，一定范围内 Al、Mg 含量增加会提高耐蚀性几倍到十几倍。

加 Mg 之后的另一大优点是钢板的切边耐蚀性提高，含 Mg 的 Zn 基腐蚀产物会覆盖在切口表面，从而对切口形成保护。

Why is magnesium added?

The biggest advantage is corrosion resistance. The results of open laboratory accelerated test and outdoor exposure test show that the corrosion resistance can be improved several times to more than ten times with the increase of Al and Mg content in a certain range.

The other advantage of adding Mg is that the corrosion resistance of the steel plate is improved, and the Zn based corrosion products containing Mg will cover the surface of the notch, thus forming protection for the notch.



Prepainted Steel Sheets

**Prepainted
Steel Sheets**

锌铝镁镀层彩涂钢板是宝钢采用锌铝镁钢板（BaoZM®/BAOXM®/BaoAM®）作为基板，涂敷二层或者多层涂料，经过高温烘烤获得的复合涂镀层钢板。

中铝 BaoXM® 彩涂是热镀锌彩涂耐蚀性升级产品，用于传统的屋面和墙面围护结构，在切口方面具有优异的耐蚀性。同时，特别推荐用于室内外有碱性环境需求的场合，例如畜牧行业、食品、肉类鲜加工车间等。

下面，我们重点介绍高铝 / 低铝与传统镀层的表现。

耐蚀性：

对常用的四种镀层基板普通聚酯白灰彩涂钢板进行 2000 小时中性盐雾试验，加镁前后彩涂钢板平板封边盐雾试样起泡等级随盐雾时间延长基本一致，BaoAM® 基板彩涂钢板长时间试验表现更为优异；BaoAM® 基板彩涂钢板和 BaoZM® 基板彩涂钢板均比镀铝锌基板和热镀锌基板彩涂钢板的折弯和切口扩蚀宽度改善。

Prepainted steel with hot-dip Zinc-aluminum-magnesium employs hot-dip BaoZM®/BAOXM®/BaoAM® as a substrate, with 2 or more coat layers through high baking.

BaoXM® based product is updated from the one based on GI, which perform well in corrosion resistance of incision when applied as roof and wall. Meanwhile it is especially recommended for alkaline environment, such as animal husbandry, food/meat/processing workshop.

Let us talk about the performance of prepainted steel based on BaoZM®/BaoAM®/GI/GL.

Corrosion resistance:

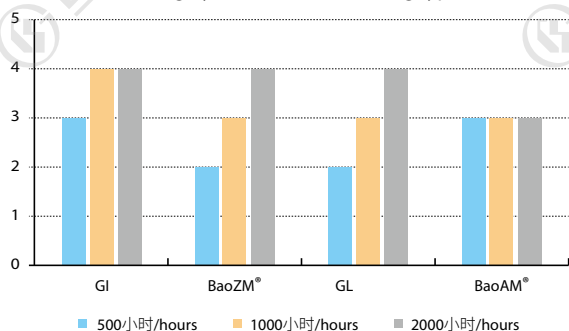
The neutral salt spray test for 2000 hours was carried out on four kinds of regular polyester with white gray color. The performance of blistering on plates with sealed edges before and after adding magnesium were basically consistent with the extension of salt spray time. Prepainted steel on BaoAM® shows better abilities in long time test. Prepainted steel on BaoAM® and BaoZM® are better compared with GL substrates, concerning the extending widths of bends and cuts.

宝钢针对相关产品进行了系列测试，供参考。供货保证值按照相应订货标准。

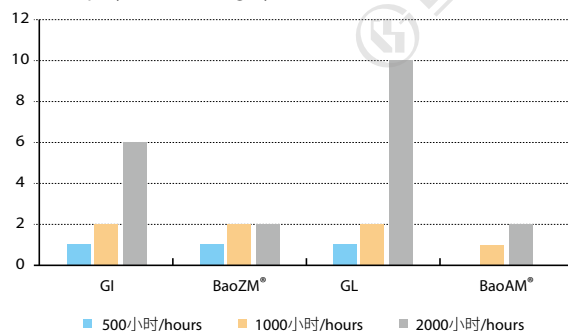
Baosteel has conducted a series of tests on related products, and the data is for reference. The supply guarantee value is in accordance with the corresponding ordering standards.

| 基板种类 Substrate | 钢板厚度 Thickness(mm) | 标称镀层重量 coating mass (g/m ²) | 涂层种类和颜色 Type and color of organic coat | 标称涂层膜厚 Thickness of organic coat (微米) |
|-------------------|-----------------------|--|--|--|
| GL | 0.5 | 75/75 | 聚酯白灰 regular polyester with white gray color | 20 |
| BaoAM® | 0.5 | 75/75 | | 20 |
| GI | 0.5 | 70/50 | | 20 |
| BaoZM® | 0.5 | 70/70 | | 20 |

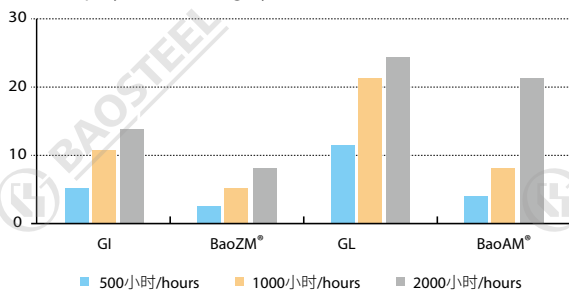
0.5mm 不同镀层种类聚酯白灰起泡等级变化
Changes of blistering grades of 0.5mm regular polyester
(white gray) with different coating types



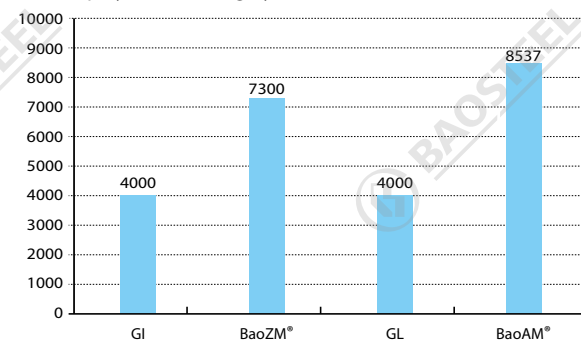
0.5mm 不同镀层种类聚酯白灰划线扩蚀平均宽度变化
Changes on extending widths of scribes on 0.5mm regular
polyester (white gray) with different substrates



0.5mm 不同镀层种类聚酯白灰切口扩蚀宽度变化
Changes on extending widths of cuts on 0.5mm regular
polyester (white gray) with different substrates



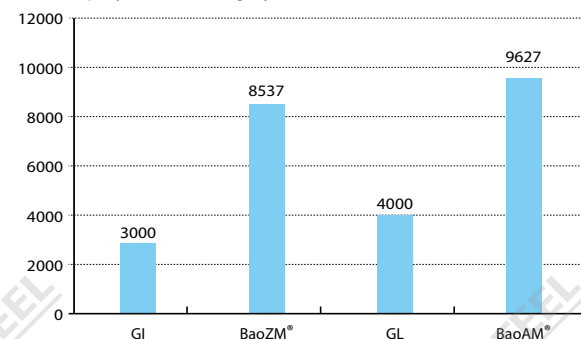
0.5mm 厚度不同镀层聚酯白灰钢板折弯红锈时间
Appearing time of red rusts on 0.5mm bending regular
polyester (white gray) with different substrates



中性盐雾试验中，从出红锈时间看，BaoAM® 基板彩涂钢板和 BaoZM® 基板彩涂钢板均比镀铝锌基板和热镀锌基板彩涂钢板的折弯和切口耐蚀性提高约 2 倍。中性盐雾试验中，从出红锈时间看，BaoAM® 基板彩涂钢板和 BaoZM® 基板彩涂钢板均比镀铝锌基板和热镀锌基板彩涂钢板的平板耐蚀性提高约 10-50%。

Concerning the appearance time of red rust in neutral salt spray test, the bending and cutting corrosion resistance of prepainted steel on BaoAM® and BaoZM® is about 2 times higher than that of the GL or GI. Concerning the appearance time of red rust in neutral salt spray test, corrosion resistance of prepainted plates on BaoAM® and BaoZM® is about 10-50% higher than that on the GL or GI.

0.5mm 厚度不同镀层种类聚酯白灰切口红锈时间
Appearing time of red rusts on cuts of 0.5mm regular
polyester (white gray) with different substrates

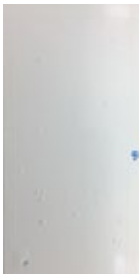

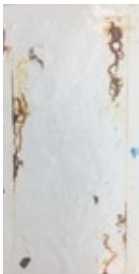









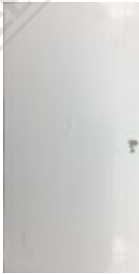
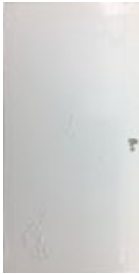



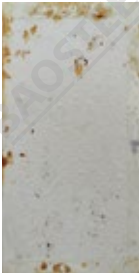


平面耐蚀性

试验条件：中性盐雾试验 ASTM B117-73，封边










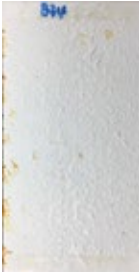
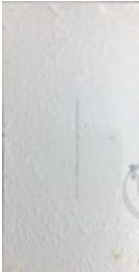

Corrosion resistance of prepainted plates

Testing methods:neutral salt spray test ASTM B117-73, sealed edges

| 涂镀层种类 | 3000 | 11000 | 14500 | 16000 | 18500 | 30000 |
|---|---|---|---|--|---|---|
| GI 70/50g/m ² 聚酯白灰 regular polyester with white gray color |  |  |  | | | |
| BaoZM® 70/50g/m ² 聚酯白灰 regular polyester with white gray color |  |  |  |  | | |
| GL 75/75g/m ² 聚酯白灰 regular polyester with white gray color |  |  |  |  |  | |
| BaoAM® 75/75g/m ² 聚酯白灰 regular polyester with white gray color |  |  |  |  |  |  |

试验条件：中性盐雾试验 ASTM B117-73，不封边

Testing methods:neutral salt spray test ASTM B117-73, unsealed edges

| 涂镀层种类 | 3000 | 4000 | 5000 | 7000 | 10000 | 11000 |
|---|---|---|---|--|---|---|
| GI 70/50g/m ² 聚酯白灰 regular polyester with white gray color |  |  | | | | |
| BaoZM® 70/50g/m ² 聚酯白灰 regular polyester with white gray color |  |  |  |  |  | |
| GL 75/75g/m ² 聚酯白灰 regular polyester with white gray color |  |  |  |  | | |
| BaoAM® 75/75g/m ² 聚酯白灰 regular polyester with white gray color |  |  |  |  |  |  |

不同镀层彩涂钢板户外曝晒

户外曝晒试验是材料在真实环境下的老化和腐蚀情况的试验方法，宝钢锌铝镁基板彩涂钢板选择在典型的温带海洋性气候青岛站、热带海洋性气候的万宁站和具有酸雨特性的江津站进行试验。从2年曝晒试验结果看，加镁之后的 BaoZM[®] 基板彩涂钢板和 BaoAM[®] 基板的彩涂钢板切口耐蚀性均优于原热镀锌镀层 (GI) 和镀铝锌镀层 (GL) 基板的彩涂钢板。

Outdoor exposure of color coated steel plates with different coatings

Outdoor exposure test is a test method for aging and corrosion of materials in real environment. Prepainted steel on different substrate is tested in Qingdao station with typical temperate marine climate, Wanning station with tropical marine climate and Jiangjin station with acid rain characteristics. According to the results of 2-year exposure test, the performance of corrosion resistance on cuts of BaoZM[®] and BaoAM[®] was better than that of GI or GL substrates.

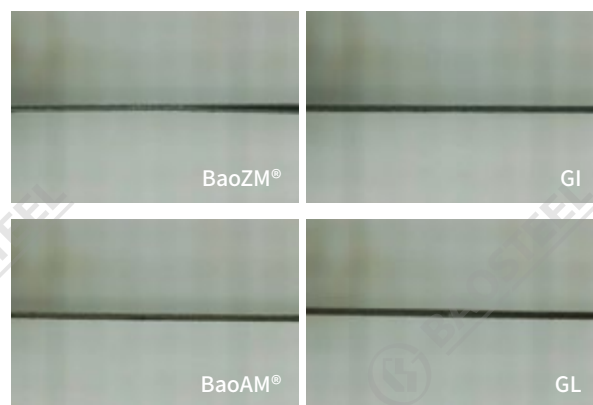
江津曝晒2年 聚酯白灰 (70g/m²镀层)

2-year exposure in Jiangjin on regular polyester with white gray color (coating mass 70g/m²)

划线 Scribe



切口 Cut



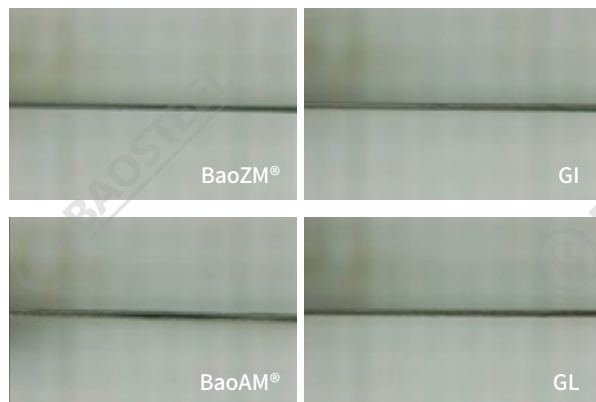
青岛曝晒2年 聚酯白灰 (70g/m²镀层)

2-year exposure in Qingdao on regular polyester with white gray color (coating mass 70g/m²)

划线 Scribe



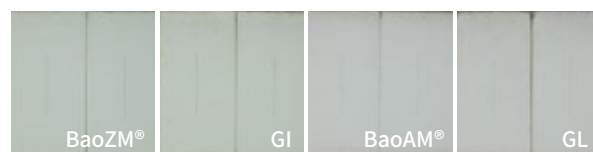
切口 Cut



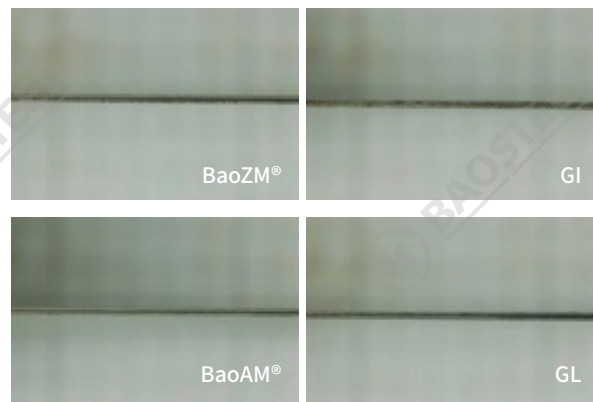
万宁曝晒2年 聚酯白灰 (70g/m²镀层)

2-year exposure in Wanning on regular polyester with white gray color (coating mass 70g/m²)

划线 Scribe



切口 Cut



BaoZM® 镀层基板彩涂钢板可以满足正常辊压成型和折弯成型要求。

Prepainted steel sheet based on BaoZM® can meet the requirements of forming



高铝锌铝镁镀层 (BaoAM®) 彩涂钢板满足建筑用途用户加工需求

Prepainted steel sheet based on BaoAM® can meet the requirements of forming



Introduction of New Products

新产品介绍

畜牧业用彩涂

Prepainted steel for animal husbandry



Prepainted Steel Sheets

从基板耐蚀性、涂层厚度、涂料种类以及实验室模拟等方面开展了研究，宝钢针对畜牧行业开发了系列产品。

研究表明^[1-6]，猪舍的有害物质主要是氨气和硫化氢，温度和湿度也是促进有害物质腐蚀钢铁材料的因素；鸡群在鸡舍中的密集饲养，鸡舍内会产生一系列有毒有害气体，如氨气、硫化氢、一氧化碳和二氧化碳等，这些有害气体对鸡群的健康影响很大，也是造成材料腐蚀的主要因素。

Based on the study of factors such as substrates, coats and laboratory simulation, Baosteel has developed a series of products for animal husbandry industry.

It can be seen from the literatures^[1-6] that the main harmful substances in piggery are ammonia and hydrogen sulfide, and temperature and humidity are also factors that promote the corrosion of steel materials by harmful substances; When chickens are intensively raised in the henhouse, a series of poisonous and harmful gases will be produced in the henhouse, such as ammonia, hydrogen sulfide, carbon monoxide and carbon dioxide. These harmful gases have a great impact on the health of chickens and are also the main factors causing material corrosion.

- 1、张燕云等，基于 fluent 的养猪场恶臭风险分析与应用，安全与环境学报，Vol.15, No.1, Feb, 2015
- 2、谢秋菊等，基于 L-M 优化算法的猪舍氨气浓度预测模型研究，东北农业大学学报，45 (10) : 74-79, Oct, 2014
- 3、朱凤舞等，基于 Zigbee 和 GPRS 鸡舍有害气体监控系统的设计，VOL.36, No.07, 2016 农业与技术
- 4、刘卫东等，大米蛋白肽对肉鸡生产性能健康状况及鸡舍氨气含量的影响，中国粮油学报，Vol. 28, No. 12, Dec. 2013
- 5、肉鸡舍内有害气体控制技术研究报告。北方牧业
- 6、赵娟等，基于 AVR 单片机的鸡舍有害气体监测系统

宝钢针对相关产品进行了系列测试，供参考。供货保证值按照相应订货标准。

Baosteel has conducted a series of tests on related products, and the data is for reference.

► 1、模拟畜舍腐蚀条件研究
Study on corrosion condition of simulated animal house

检测用试剂
Test reagent

| 编号 | 试剂名称 | 浓度 | 用途 |
|----|------|-------|---------|
| 1 | 盐酸 | 10% | 常用试剂 |
| 2 | 硫酸 | 10% | 常用试剂 |
| 3 | 乙酸 | 10% | 常用试剂 |
| 4 | 氢氧化钠 | 10% | 常用试剂 |
| 5 | 磷酸铵 | 10% | 肥料 |
| 6 | 氨水 | 30% | 排泄物 |
| 7 | 尿素 | 10% | 排泄物 |
| 8 | 硝酸钠 | 10% | 肉类加工添加剂 |
| 9 | 乳酸 | 10% | 饲料添加 |
| 10 | 次氯酸钠 | 10% | 消毒 |
| 11 | 福尔马林 | 40% | 消毒 |
| 12 | 双氧水 | 30% | 消毒 |
| 13 | 过氧乙酸 | 0.30% | 消毒 |
| 14 | 新洁儿灭 | 0.10% | 消毒 |

对 630 个试样、三种试验条件、24--1000 小时试验结果的评估，主要结论如下：

- 1) 氟碳涂层在特殊试剂中的表现是最优异的，且基板种类影响不大；
- 2) 畜牧专用涂层是仅次于氟碳的品种，与基板种类影响不大，但是降低膜厚不利；
- 3) 宝钢热镀锌基板畜牧专用高耐候聚酯产品也表现较好。

Based on the evaluation of 630 samples, three test conditions and 24-1000 hours test results, the main conclusions are as follows:

- 1) The performance of fluorocarbon coat in special reagents is the best, and the type of substrate has little effect.
- 2) The coat for animal husbandry is second only to fluorocarbon, which has little influence on the substrate, but it is unfavorable to reduce the film thickness
- 3) Baosteel's hot-dip galvanized substrate with high durable polyester for animal husbandry products also performed well.

► 2、宝钢畜牧专用彩涂钢板选型推荐（具体使用条件详见产品承诺书）

Recommendation of prepainted steel for animal husbandry (Conditions of application as Baosteel's Declaration)

畜舍室内用途

Inner recommendation for animal husbandry

| 镀层类型 Coat types | 最低 镀层重量 minimal coat mass (g/m ²) | 底漆种类 Types of primer | 面漆种类 Types of finish | 最低膜厚 minimal thickness of organic coat (μm) | 最低涂层 完整性寿命(年) Minimal life of organic coat on wholeness (yers) | 最低使用寿命 (穿孔,年) Minimal life of application (perforation, years) |
|--------------------|---|-------------------------|-----------------------------|--|--|--|
| 热镀锌 GI | 90/90 | 聚氨酯 PU | 畜牧专用高耐久聚酯面漆 SPECIAL HDP | 22 (5+17) | 15 | 18 |
| | 90/90 | 畜牧专用底漆 SPECIAL | 畜牧专用聚酯面漆 SPECIAL PE | 30 (10+20) | 20 | 23 |
| | 110/110 | 聚氨酯 PU | 畜牧专用氟碳面漆 SPECIAL PVDF | 23 (5+18) | 25 | 28 |
| 镀铝锌 GL | 75/75 | 聚氨酯 PU | 畜牧专用高耐久聚酯面漆 SPECIAL PVDF | 22 (5+17) | 15 | 25 |
| | 75/75 | 畜牧专用底漆 SPECIAL | 畜牧专用聚酯面漆 SPECIAL PE | 30 (10+20) | 20 | 30 |
| | 75/75 | 聚氨酯 PU | 畜牧专用氟碳面漆 SPECIAL PVDF | 23 (5+18) | 25 | 35 |
| 高铝锌铝镁 AM | 75/75 | 聚氨酯 PU | 畜牧专用高耐久聚酯面漆 SPECIAL HDP | 22 (5+17) | 15 | 30 |
| | 75/75 | 畜牧专用底漆 SPECIAL | 畜牧专用聚酯面漆 SPECIAL PE | 30 (10+20) | 20 | 35 |
| | 75/75 | 聚氨酯 PU | 畜牧专用氟碳面漆 SPECIAL PVDF | 23 (5+18) | 25 | 40 |

畜舍室外用途

Outer recommendation for animal husbandry

| 镀层类型 Coat types | 最低 镀层重量 minimal coat mass (g/m ²) | 底漆种类 Types of primer | 面漆种类 Types of finish | 最低膜厚 minimal thickness of organic coat (μm) | 最低涂层 完整性寿命(年) Minimal life of organic coat on wholeness (yers) | 最低使用寿命 (穿孔,年) Minimal life of application (perforation, years) |
|--------------------|---|-------------------------|-----------------------------|--|--|--|
| 热镀锌 GI | 90/90 | 聚氨酯 PU | 畜牧专用高耐久聚酯面漆 SPECIAL HDP | 22 (5+17) | 15 | 18 |
| | 110/110 | 畜牧专用底漆 SPECIAL | 畜牧专用聚酯面漆 SPECIAL PE | 30 (10+20) | / | 23 |
| | 110/110 | 聚氨酯 PU | 畜牧专用氟碳面漆 SPECIAL PVDF | 23 (5+18) | 20 | 28 |
| 镀铝锌 GL | 75/75 | 聚氨酯 PU | 畜牧专用高耐久聚酯面漆 SPECIAL PVDF | 22 (5+17) | 15 | 25 |
| | 75/75 | 畜牧专用底漆 SPECIAL | 畜牧专用聚酯面漆 SPECIAL PE | 30 (10+20) | / | 30 |
| | 75/75 | 聚氨酯 PU | 畜牧专用氟碳面漆 SPECIAL PVDF | 23 (5+18) | 20 | 35 |
| 高铝锌铝镁 AM | 75/75 | 聚氨酯 PU | 畜牧专用高耐久聚酯面漆 SPECIAL HDP | 22 (5+17) | 15 | 30 |
| | 75/75 | 畜牧专用底漆 SPECIAL | 畜牧专用聚酯面漆 SPECIAL PE | 30 (10+20) | / | 35 |
| | 75/75 | 聚氨酯 PU | 畜牧专用氟碳面漆 SPECIAL PVDF | 23 (5+18) | 20 | 40 |

备注：如有变化，以宝钢股份发布的相应最新承诺为准。

Remarks: in case of any change, the latest corresponding commitment issued by Baosteel shall prevail.

Introduction of New Products

新产品介绍

铝合金、不锈钢基板彩涂
Prepainted steel with Al alloy
coated/stainless steel substrate



Prepainted Steel Sheets

铝合金基板彩涂在建筑业中得到广泛的应用，为现代建筑向舒适、轻型、耐久、经济、环保等方向发展发挥了重要的作用。A3004 铝镁锰合金由于结构强度适中、耐候、耐渍、易于折弯焊接加工等优点，被普遍认为作为建筑设计使用寿命 50 年以上的屋面、外墙材料。

在经过预处理的铝合金基板上，涂敷 1 层或者 2 层以上的涂层，再经过烘烤固化形成的铝合金基板彩涂，不仅能够附加各种颜色，避免光污染，而且增加对基板的保护，提高了耐腐蚀性。铝合金彩涂划线经过 6500 小时后盐雾表现优异。

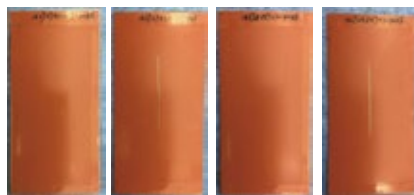


不锈钢有着接近镜面的光亮度，触感硬朗冰冷，属于比较前卫的装饰材料，具有优异的耐蚀性、成型性、相容性及强韧性等系列特点，用于重工业、轻工业、生活用品行业以及建筑装饰等行业中。在经过预处理的不锈钢基板上，涂敷 1 层或者 2 层以上涂层，再经过烘烤固化形成的不锈钢基板彩涂，推荐使用在苛刻的腐蚀环境条件下。

Prepainted steel with Aluminum alloy substrate is widely used in the construction industry, which plays an important role in the development of modern architecture to the direction of comfort, light, durability, economy and environmental protection. A3004 Al-Mg-Mn alloy is widely considered as a roofing and exterior wall material with a service life of more than 50 years due to its moderate structural strength, weather resistance, stain resistance and easy bending and welding.

Aluminum alloy substrate is coated with two or more layers of coating by high temperature baking. It not only avoid light pollution, but also increase the protection of the substrate, improve the corrosion resistance. After 6500 hours, the salt spray performance of prepainted aluminum alloy steel is excellent.

Stainless steel is an avant-garde decorative material with brightness close to the mirror surface and cold touch. It has excellent corrosion resistance, formability, compatibility and toughness. It is used in heavy industry, light industry, daily necessities industry and architectural decoration industry. It is recommended to apply one or more organic coats on the pre-treated stainless steel substrate, and then bake and solidify to form the stainless steel substrate color coating under harsh corrosive environment.



SST 5500 小时

Test
试验

腐蚀过程 Process of Corrosion

劣化过程：

失光 → 褪色 → 粉化 → 表面开裂 → 涂层起泡脱落 → 白
/ 红锈

劣化现象：如下表所示

Process of corrosion of the prepainted steel sheet

The organic coating on surface of the prepainted steel sheet can prevent the base metal coated with the coating from being quickly corroded. And the coated base metal selected for the prepainted steel sheet also possess corresponding resistance to corrosion.

So, the resistance to corrosion of the prepainted steel sheet mainly includes two parts, namely the resistance of the base metal and the resistance to deterioration of the coating film. Under normal circumstances, the process of deterioration often starts from a loss of gloss, and then the chalking and shedding of the membrane. Owing to the decomposition of the resin content, the surface of the coating membrane starts chalking and then shedding.

Process of Deterioration

Lost of gloss → fading → chalking → surface rupture → blistering and shedding of the coating membrane → white / red rust

Apperance of Deterioration: shown in the following table:

| 劣化过程 / Process of deterioration | 原因 / Reason |
|-------------------------------------|---|
| 失光、变色 / Loss of gloss, color change | 树脂、颜料变化、分解 / Decomposition, chalking of resin and pigments |
| 粉化、开裂 / Chalking and shedding | 由于树脂分解使表面出现粉末状龟裂 / Surface fracture and chalking after the decomposition of the resin |
| 起泡、脱落 / Blistering and shedding | 起因于锌生锈, 在表面渗出 / Caused by the rusted zinc content seeped through the surface |
| 白锈、红锈 / White/red rust | 起因于局部的初期腐蚀和铁的腐蚀 / Caused by partially initial corrosion and the corroded base metal |

Prepainted Steel Sheets

► 彩涂板的腐蚀过程

涂层钢板表面的有机涂层起覆盖隔离作用可防止涂膜下的基板较快的腐蚀。涂层钢板所选用镀层板也具有相应的耐蚀性。因此涂层钢板的耐腐蚀性，主要包括基板腐蚀和涂膜劣化两个方面。

在一般环境中，劣化过程首先表现为光泽降低，然后从表面引起粉化、脱落。由于树脂的分解，使涂层表面成为粉末而脱落。

试验方法 Method of Test

▶ 1、耐酸碱试验

原理

将试样在一定浓度的酸碱溶液中浸渍一定的时间，取出后评定色差、光泽的变化及是否有涂层起泡、脱落等现象。

结果

按照 GB/T 1766 对试样进行失光等级、变色等级、起泡等级、脱落等级等评定，平行试样测定结果取最差值为试验结果。

▶ 2、耐中性盐雾试验

原理

试样暴露在中性氯化钠盐雾气氛中至规定的时间后，评定其表面起泡、锈蚀等级和腐蚀蔓延距离等。

结果

(1) 对于平板试样，按照 GB/T 1766 评定起泡等级、生锈等级等，取平行试样的最差值为试验结果。

(2) 对于划叉和切口试样，在划线上选择一个代表性的区域，在至少 6 个等距离的位置上，测量划线处至起泡和锈蚀的最大腐蚀蔓延距离，取其算术平均值，即为平均腐蚀蔓延距离，并记录划线最大和最小腐蚀蔓延距离。

▶ 1. Acid/alkaline-resistance test

Principle

Soak the sample in the acid/alkaline solution with a specified concentration for a certain period, and then take it out of the solution to assess the change of color and gloss, and whether it blisters, sheds, etc.

Result

According to the standard GB/T 1766, assess the grade of the sample in loss of gloss, color change, blistering and shedding, etc.

In normal conditions, the iron is apt to rust, however, once the iron is galvanized, it will have a quite good resistance to corrosion and won't rust. For details, please refer to the test below.

▶ 2. Test of resistance to neutral salt mist

Principle

After exposing, the sample in the neutral NaCl mist for a specified time, assess the surface blistering and rusting, the outreach of surface corrosion, etc.

Result

(1) For the flat-sheet sample, assess the grade of blistering and rusting by the GB/T 1766 standard, and take the worst result as the final.

(2) For the scratched or notched sample, choose a typical area within the lineation scope, measure the intervals between the maximum outreach of corrosion of the blistered and rusted part and the lineation at six equidistant points at least, and then take the arithmetic mean value, namely the outreach of corrosion on average, and record the maximum and minimum distances at the same time.



Prepainted Steel Sheets

► 1、检验和试验

Q/BQB 440-2023 订货的产品按照以下检验和试验标准。

彩涂板的外观用肉眼检查。

彩涂板带的尺寸、外形应采用合适的测量工具测量。

彩涂板基板的力学性能、镀层性能和镀层重量应按批检验，每个检验批由不大于 50 吨的同牌号、同一锌层重量、同规格、同表面结构和表面处理的钢材组成。

彩涂板应按批检验，每批应由不大于 50 吨的同牌号、同规格、同基板（包括基板类型和镀层重量、涂层厚度、涂层结构、涂料种类和涂料颜色相同）的彩涂板组成。对于重量大于 50 吨的钢带，每个钢卷组成一个检验批。

涂层厚度可以根据涂层的特性选择采用磁性测厚仪法、千分尺法、金相显微镜法、钻孔破坏式显微镜观测法、磁性 - 涡流测厚仪法、离线和在线加固光学干涉法进行测量，争议时应采用金相显微镜法。

Test 试验

试验方法 Method of Test

取样时，对于彩涂板钢板，应在每批中任取一张，对于彩涂板钢带，应在钢带的头部或尾部切取一张。

彩涂板基板的力学性能和镀层重量的检验和试验，应符合相应基板文件的规定。

供方可采用不同的检验和试验方法对相关的技术要求进行评定。发生争议时，应采用本文件所规定的检验和试验方法。

如有某一项试验结果不符合本文件要求，则从同一批中再任取双倍数量的试样进行该不合格项目的复验。复验结果（包括该项目试验所要求的所有指标）合格，则整批合格。复验结果（包括该项目试验所要求的所有指标）即使有一个指标不合格，则复验不合格。如复验不合格，则已做试验且试验结果不合的单件不能验收，但该批材料中未做试验的单件可逐件重新提交试验和验收。

Prepainted
Steel Sheets

► 1. Inspection and testing

The products ordered by Q/BQB 440-2023 shall be inspected and tested according to the following standards.

The appearance of prepainted steel board should be inspected with the naked eye.

The size and shape of the prepainted strip should be measured using appropriate measuring tools.

The mechanical properties, coating properties, and coating weight of prepainted substrates should be inspected in batches, with each inspection batch consisting of steel of the same grade, weight of the same zinc layer, specifications, surface structure, and surface treatment, not exceeding 50 tons.

Color coated plates should be inspected in batches, and each batch should consist of prepainted steel plates of the same grade, specification, and substrate (including substrate type and coating weight, coating thickness, coating structure, coating type, and coating color) not exceeding 50 tons. For steel strips weighing over 50 tons, each coil forms an inspection batch.

The coating thickness can be measured using magnetic thickness gauge method, micrometer method, metallographic microscope method, drilling destructive microscope observation method, magnetic eddy current thickness gauge method, offline and online reinforcement optical interferometry method according to the characteristics of the coating. In case of dispute, metallographic microscope method should be used.

When sampling, for prepainted steel plates, one piece should be taken from each batch, and for prepainted steel strips, one piece should be cut from the head or tail of the strip.

The inspection items, sample quantity, and testing methods for the coating performance of each batch of prepainted plates shall comply with the provisions in the table 10 in Q/BQB 440-2023.

The inspection and testing of the mechanical properties and coating weight of prepainted steel board substrates should comply with the provisions of the corresponding substrate documents.

The supplier may use different inspection and testing methods to evaluate the relevant technical requirements. When disputes arise, the inspection and testing methods specified in this document shall be used.

If any test result does not meet the requirements of this document, double the number of samples shall be taken from the same batch for retesting of the non-conforming item. If the retest results (including all indicators required for the project test) are qualified, the entire batch is qualified. The retest result (including all the indicators required for the project test) is considered unqualified even if one indicator fails. If the reinspection is not qualified, the individual pieces that have been tested and the test results are not satisfactory cannot be accepted, but the individual pieces that have not been tested in the batch of materials can be resubmitted for testing and acceptance one by one.

Test

试验

试验方法 Method of Test



2、大气曝晒试验

为研究彩涂板在自然环境下的服役情况，宝钢开展了大气曝晒试验。

原理

彩涂板经自然大气老化后评定其涂层失光、变色、粉化、起泡、生锈、开裂等涂层老化性能。

结果

(1) 对于平板试样，按照 GB/T 1766 评定试样的失光等级、变色等级、粉化等级、起泡等级、生锈等级和开裂等级等，取平行试样的最差值为试验结果。

(2) 对于破坏试样，按照 GB/T 1766 评定试样 T 弯、冲击、划叉、铆接、折弯部位的起泡等级、生锈等级和边部腐蚀蔓延距离等，取平行试样的最差值为试验结果。

(3) 大气暴露试样的评定也可由各大气暴露试验场完成后提供试验报告。

**Prepainted
Steel Sheets**

► 2. Air exposure test

To study the service performance of color coated panels in natural environments, Baosteel conducted atmospheric exposure tests.

Principle

Assess the loss of gloss, color change, chalking, blistering, rusting, cracking and other aging features of the coating membrane after the prepainted steel sheet aged for being exposed in the air.

Result

- (1) For the flat-sheet sample, assess the its grade in loss of gloss, color change, chalking, blistering, rusting, cracking, etc. by the GB/T 1766 standard, and take the worst result as the final.
- (2) For the sample of destroyed steel sheet, assess the grade of all parts bended in T shape, shocked, scratched, riveted or curved in blistering, rusting and outreach of corrosion, etc. by the GB/T 1766 standard, and take the worst result as the final.
- (3) This test can also be performed by other labs of air exposure, and it is required that the lab should submit the relevant test report to Baosteel.





Prepainted Steel Sheets

质量保证

通过了 ISO9001、ISO/TS 16949 质量认证，建立和完善了一整套质量保证体系。

在一整套质量保证制度下，从订货、订单处理、质量设计、原料采购、生产计划的编制、产品的生产、试验检验，以及产品的包装、入库和发货等，都有完整的规程，并且通过整体产销系统计算机管理，不但提高了工作效率，而且保证了产品的质量。

使用承诺

中国地区提供

PVDF 提供 20 年的美观寿命保证。

HDP 提供 15 年的美观寿命保证。

不同基板和涂层的组合产品提供 15-50 年的使用寿命保证（腐蚀穿孔前）。

备注：如有变化，以宝钢股份发布的相应最新承诺为准。

海外地区可以按照具体项目环境进行评估和出具。

Quality Assurance

质量保证

防伪

宝钢彩涂板是目前国内很多重点工程的首先材料，广大设计院和业主都积极推荐和选用宝钢彩涂板。但是市场上出现了仿冒的宝钢彩涂板，给用户的辨别和使用带来了困惑，如何辨别真伪，是宝钢和用户共同关心和迫切需要解决的问题。

从 2016 年开始，宝钢彩涂板率先应用高速数码喷印技术，在彩涂钢板生产的同时，钢板背面间断喷印唯一的加密二维码和卷号、生产时间等信息。加密二维码只有宝钢可以解析，宝钢将会对每一次的扫描解析进行记录，从而帮助用户根据解析内容判别所购产品真伪。用户可以采用手机等装备进行二维码扫描，以核对钢卷真伪。

质量检测

宝钢的彩涂机组装备了大量先进的在线测试仪器，以保证和提高产品的质量，并且有一整套产品性能测试的设备和方法，对日常生产出的彩涂产品进行各有关性能的测试和控制，保证了产品质量达到国内领先水平和国际同类产品的水平。

产销研一体化

我们已经形成了产销研一体化的工作制度，在对市场调查，以及对用户状况的反馈，对产品质量和品种的开发和改进方面具有重大意义。

Quality Assurance

Baosteel has already passed the authentication by the ISO9001 and TS16949 in succession and established a completed set of quality assurance system. Under such a complete set of quality assurance systems, there has a complete set of regulations for ordering, order handling, quality design, purchasing raw materials, working out production plan, production, test and inspection, packaging, storage, delivering, etc. In addition, the PC-based production and marketing system not only improves the working efficiency but also assures the quality of product.

Service Promise

For China domestic

PVDF provides with a 20-year promise of Beauty.

HDP provides with a 15-year promise of Beauty.

The combination of different substrates and coats provides a 15-50 year service life guarantee(Before corrosion performance).

Remarks: in case of any change, the latest corresponding commitment issued by Baosteel shall prevail.

It can be assessed and provided based on specific project environments for oversea projects.

Anti-counterfeit Prepainted Steel Sheet

Nowadays, prepainted steel of Baosteel is on the priority purchasing list of many important construction projects. The institutions of design and the proprietors are actively in recommending or using the prepainted steel of Baosteel. Unfortunately, the counterfeits are raising up in the market, which confuse the customers in the identity and usage. How to identify the real to the fake grows into an emergency.

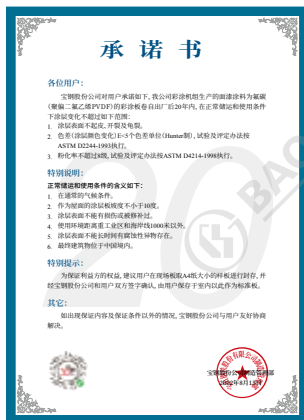
Baosteel is the pioneer to employ the advanced technology of Digital jet printing. The back of the coil will be covered by the print with a unique two-dimension code which is encrypted as well as the coil numbers and production time. The encrypted two-dimension codes can only be deciphered by Baosteel. And once it is scanned and deciphered, the record will be made. It is a convenient way for the customers to use the cell phones to identify the reality by scanning the codes.

Quality Inspections

Baosteel's prepainted steel sheet lines are equipped with a large amount of online test instruments so that they can ensure and improve the quality of product. There also has a complete set of equipment and techniques for testing and controlling the performance of their prepainted steel products, which ensures Baosteel's product quality to take a leading position among the fellow products at home and reach the international standard.

Production-Marketing-Research Integration

We have established a complete set of working systems in production, marketing, research and development, which has significant meanings at all aspects, covering market investigation, response to customer's feedback, quality control, improvement and innovation in products, etc.



Service Guide

使用指南

订货 Order



Prepainted Steel Sheets

询价和订货

询价和订货时请提出以下详细的内容：

产品名称（例如热镀锌彩涂板）

技术标准（如 Q/BQB 440）

牌号（如 TDC51D+Z）

镀层重量（如有特殊要求应写明）

涂层结构（如上、下表面都涂二层即 2/2；上表面涂二层，下表面涂一层即 2/1）

规格（厚 × 宽 × 长）

尺寸允许偏差

正面面漆种类

颜色（若特殊颜色需附样板并协商）

正反面（一般面漆卷在外面）

卷重（3-5 吨）

卷内径（610mm 或 508mm）

数量（吨）

用途

包装方式（立式或卧式）

交货期

**Prepainted
Steel Sheets**

Enquiry and order

Please offer the details as follows when enquiry and ordering:

Name of Product

(e.g. hop-dip zinc-coated prepainted steel sheet)

Technical Standard

(Q/BQB 440) Grade (e.g. TDC51D+Z)

Weight of coating

(if any special requirement, please give clear indications.)

Structure of coating (e.g. double coatings on both top and bottom sides, i.e. 2/2; double coatings on top side and one coating on bottom side, i.e. 2/1)

Specs (thickness * width * length)

Allowance of size

Category of front finish coatings

Color (if any special requirements of color please enclose your specimen and timely negotiate with us)

Front and back (Generally finish coat coil faces outside)

Coil Weight (3~5 tons) **Coil Inner Diameter** (610mm or 508mm)

Quantity (tons)

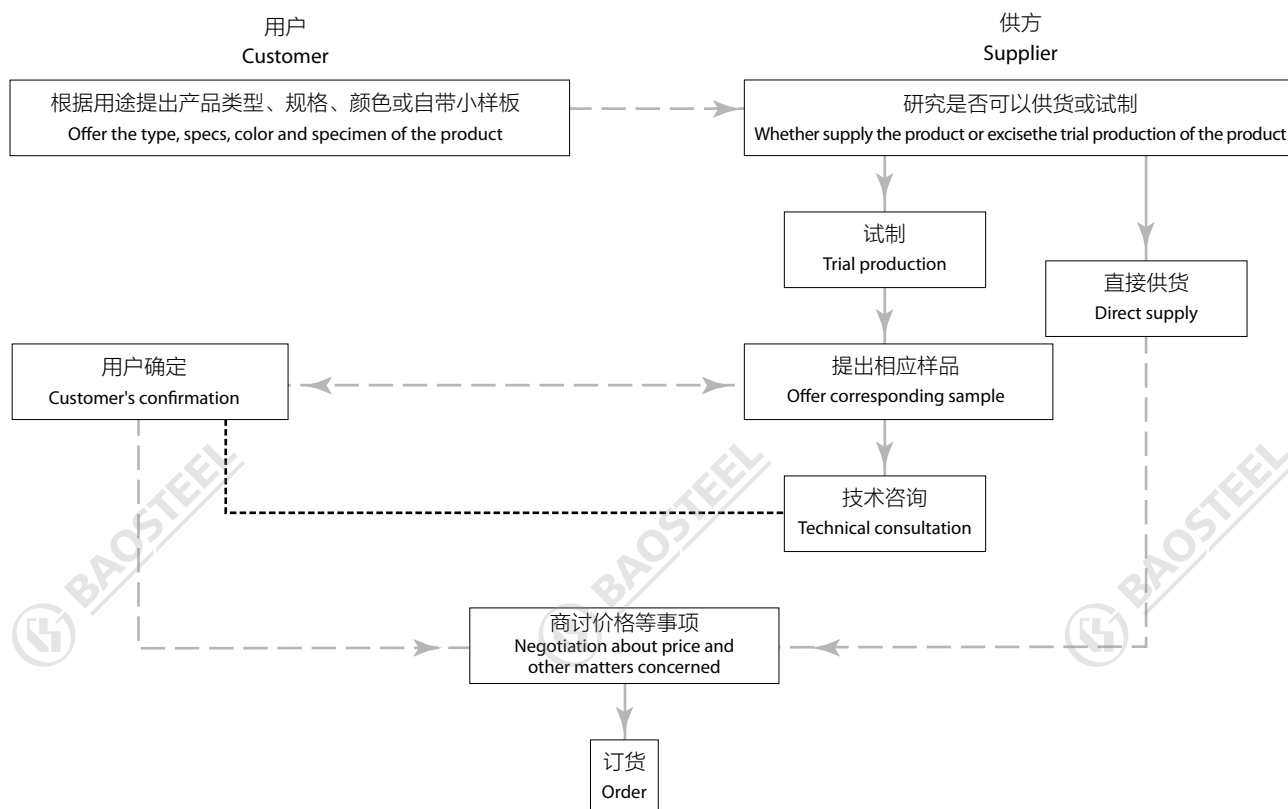
Purpose

Packing Method (vertical or horizontal)

Date of Delivery

订价订货流程:

Flow of enquiry and order



Service Guide

使用指南

选材 Material Choice



Prepainted Steel Sheets

合理的选材不仅可以满足使用要求，而且可以最大限度的降低成本。如果选材不当，其结果可能是材料性能超过了使用要求，造成不必要的浪费；也可能是达不到使用要求，造成降级或无法使用。因此，需方应高度重视合理选材的重要性，必要时应向有关专家咨询。

彩涂板的选择主要指力学性能、基板类型和镀层重量、正面涂层性能和反面涂层性能的选择。用途、使用环境的腐蚀性、首次大修寿命、耐久性、加工方式和变形程度等是选材时考虑的重要因素。

► 力学性能、基板类型和镀层重量的选择

力学性能主要依据用途、加工方式和变形程度等因素进行选择。在强度要求不高、变形不复杂时，可采用 TDC51D、TDC52D 系列的彩涂板。当对成形性有较高要求时就应该选择 TDC53D、TDC54D 系列的彩涂板。对于有承重要求的

构件，应根据设计要求选择合适的结构钢，如 TS280GD、TS350GD 系列的彩涂板。剪切、弯曲、辊压等是彩涂板常用的加工方式，订货时应根据每种加工方式的特点进行选择。实际生产时通常用基板的力学性能代替彩涂板的力学性能，而彩涂工艺可能导致基板的力学性能发生变化。另外，力学性能也可能随储存时间的增加而发生变化。这些都会增加彩涂板加工成形时出现吕德斯带或折痕的可能性，对此应予以注意。

基板类型和镀层重量主要依据用途、使用环境的腐蚀性、首次大修寿命和耐久性等因素进行选择。防腐是彩涂板的主要功能之一，基板类型和镀层重量是影响彩涂板耐腐蚀性的主要因素。建筑用彩涂板通常选用热镀锌基板、热镀锌镁合金基板、热镀铝锌合金基板和热镀铝锌镁合金基板，主要是因为这几种基板的耐蚀性较好。电镀锌基板受工艺限制，锌层通常较薄，耐蚀性相对较差，且生产成本较高，因此很少使用。镀层重量应根据使用环境的腐蚀性来确定。在腐蚀性高

Prepainted
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的环境中应使用耐腐蚀性好、镀层重量大的基板，以确保达到规定的首次大修寿命和耐久性。另外，选择基板时还应注意各类基板切口耐腐蚀性的差异。

► 正面涂层性能的选择

正面涂层性能的选择主要指涂料种类、涂层厚度、涂层色差、涂层光泽、涂层硬度、涂层柔韧性 / 附着力、涂层耐久性以及其他性能的选择。

A rational material choice can not only meet the customer's requirements but also lower the cost at the maximum level. If any improper choice of materials, the performance of materials may surpass the application requirements, as a result, just a waste of materials, otherwise it may not reach the requirements and lead to being degraded or discarded as a useless. Therefore, customers should pay much attention to the proper choice of material. If any, please contact us. The choice of the prepainted steel sheet is mainly determined by the mechanical property, type of base metal (type of coating), weight of coating, and the choices of the performances of front coating and back coating. Its usage, environmental corrosion, service time, durability, machining method and distortion level are the important factors that should be taken into consideration when choose relevant materials.

► Choice of mechanical performance, type of base metal and weight of coating

The mechanical properties are mainly selected based on factors such as purpose, processing method, and degree of deformation. When the strength requirement is not high and the deformation is not complex, TDC51D and TDC52D series prepainted steel can be used. When there is a high demand for formability, TDC53D and TDC54D series plates of prepainted steel should be selected. For components with load-bearing requirements, suitable structural steel should be selected according to design requirements, such as TS280GD and TS350GD series prepainted steel plates. Cutting, bending, and rolling are commonly used processing methods for panels of

prepainted steel. When placing an order, the selection should be based on the characteristics of each processing method. In actual production, the mechanical properties of the substrate are usually applied, instead of the mechanical properties of prepainted steel board, while the prepainted process may cause changes in the mechanical properties of the substrate. In addition, mechanical properties may also change with increasing storage time. These will increase the possibility of Lüders lines or creases appearing during the processing and forming of prepainted boards, which should be taken into consideration.

The substrate type and coating weight are mainly selected based on factors such as the purpose, corrosiveness of the usage environment, first overhaul life, and durability. Anti corrosion is one of the main functions of prepainted steel panels, and the type of substrate and the weight of the coating are the main factors affecting the corrosion resistance of prepainted steel panels. Prepainted steel panels for construction usually use hot-dip galvanized substrates, hot-dip Zn-Mg alloy coated substrates, hot-dip Al-Zn alloy coated substrates, and hot-dip Al-Zn-Mg alloy coated substrates, mainly because these substrates have good corrosion resistance. Electroplated galvanized substrates are limited by the process, and the zinc layer is usually thin, with relatively poor corrosion resistance and high production costs, so they are rarely used. The weight of the coating should be determined based on the corrosiveness of the usage environment. In highly corrosive environments, substrates with good corrosion resistance and heavy coating weight should be used to ensure the specified first overhaul life and durability. In addition, when selecting substrates, attention should also be paid to the performance in corrosion resistance of cuts.

► Selection of Front Coating

The selection of positive coating performance mainly refers to the selection of coating type, coating thickness, coating color difference, coating gloss, coating hardness, coating flexibility/adhesion, coating durability, and other properties.

► 面涂料种类

常用的面漆有聚酯、硅改性聚酯、高耐久性聚酯和聚偏二氟乙烯，不同面漆的硬度、柔韧性 / 附着力、耐久性等方面存在一定的差异。聚酯是目前使用量最大的涂料，耐久性一般，涂层的硬度和柔韧性好，价格适中。硅改性聚酯通过有机硅对聚酯进行改性，耐久性和光泽、颜色的保持性有所提高，但涂层的柔韧性略有降低。高耐久性聚酯既有聚酯的优点，又在耐久性方面进行了改进，性价比比较高。聚偏二氟乙烯的耐久性优异，涂层的柔韧性好，但硬度相对较低，可提供的颜色也较少，价格昂贵。各种面漆详细的性能指标可参考有关资料或向专家咨询。面漆主要根据用途、使用环境的腐蚀性、首次大修寿命、耐久性、加工方式和变形程度等因素来确定。

底漆

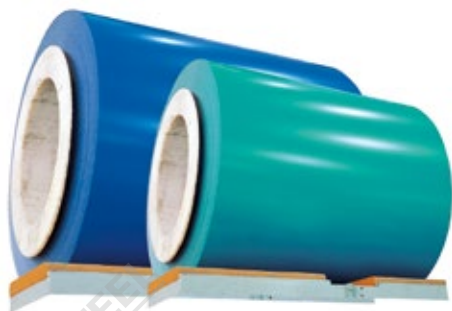
常用的底漆有环氧、聚酯和聚氨酯，不同底漆的附着力、柔韧性、耐腐蚀性等方面存在一定的差异。环氧与基板的结合力良好，耐腐蚀性较高，但柔韧性不如其他底漆。聚酯与基板的结合力好，柔韧性优异，但耐腐蚀性不如环氧。聚氨酯是综合性能相对较好的底漆。各种底漆详细的性能指标可参考有关资料或向专家咨询。底漆通常由供方根据生产工艺、用途、使用环境的腐蚀性以及与面漆的匹配关系来选择。

► Top coat

The top coats commonly used can be classified into four groups, namely polyester, silicon modified polyester, high-durability polyester and polyvinylidene fluoride. The top coats have different performances in rigidity, flexibility/adhesive force, corrosion resistance, etc. The coating of polyester is the most popular coating for the time being, which has common durability, good rigidity and flexibility of coating and moderate price. The coating of silicon modified polyester has been already greatly improved in durability and retention of gloss and color, but the flexibility of its coating is still lower. The high-durability polyester coating not only possesses the merits of the polyester coating but also makes a great improvement in durability. Its quality is better. The coating of polyvinylidene fluoride has excellent durability and good flexibility of coating, while its rigidity is relatively poor, its color available is less and its price is high. For details of these top coats, please consult about relevant materials or contact experts. The topcoat is mainly determined based on factors such as its use, the corrosiveness of the usage environment, the lifespan of the first major overhaul, durability, processing method, and degree of deformation.

Primer

The primers commonly used consist of epoxy, polyester and polyurethane. Different primers can be differed by the adhesive force, flexibility, resistance to corrosion, etc. The epoxy primer has strong adhesive force to the base metal and higher resistance to corrosion, while its flexibility is poorer than those of other primers. The polyester primer has strong adhesive force to the base metal and excellent flexibility, while its resistance to corrosion is poorer than that of the epoxy primer. The polyurethane primer is a better primer with comprehensively good performances. For details of these primers, please consult about relevant materials or contact experts. The primer is usually determined by the manufacturer through matching the primer with corresponding process technology, purpose and environmental corrosion.



涂层厚度

涂层厚度与彩涂板的耐腐蚀性有密切关系，耐腐蚀性通常随涂层厚度的增加而升高，订货时应根据使用环境的腐蚀性、首次大修寿命和耐久性等因素来确定合适的涂层厚度。

涂层色差

彩涂板在生产和使用过程中都可能出现色差，由于色差受生产组织、颜色深浅、使用时间、使用环境、用途等多种因素的影响，因此通常由供需双方在订货时协商。

涂层光泽

涂层光泽主要依据用途和使用习惯进行选择。例如，建筑用彩涂板通常选择低光泽和亚光，家电用彩板通常选择光泽或高光泽。

涂层硬度

涂层硬度是涂层抵抗擦划伤、摩擦、碰撞、压入等机械作用的能力，与彩涂板的耐划伤性、耐磨性、耐压痕性等性能有密切联系，主要依据用途、加工方式、储存运输条件等因素进行选择。

Coating thickness

The thickness of the coating is closely related to the corrosion resistance of prepainted steel board. The corrosion resistance usually increases with the increase of the coating thickness. When placing an order, the appropriate coating thickness should be determined based on factors such as the corrosiveness of the usage environment, the first major overhaul life, and durability.

Color difference of coating

Color difference may occur during the production and use of prepainted steel boards. Due to the influence of various factors such as production organization, color type, usage time, usage environment, and purpose, color difference is usually negotiated between the supply and demand parties during ordering.

Coating Gloss

The gloss of the coating is mainly selected based on its purpose and usage habits. For example, prepainted steel panels for construction typically choose low gloss and matte, while prepainted steel panels for household appliances typically choose high gloss.

Coating hardness

Coating hardness refers to the ability of a coating to resist mechanical effects such as scratching, friction, collision, and indentation. It is closely related to the scratch resistance, wear resistance, and pressure resistance of prepainted steel, and is mainly selected based on factors such as application, processing method, storage and transportation conditions.

涂层耐久性

涂层耐久性是彩涂板在使用过程中体现出来的性能，通常用美观寿命和首次大修寿命的长短进行衡量。涂层耐久性与涂料种类、涂层厚度、使用环境的腐蚀性等因素有密切的关系。大气暴露试验是评价涂层耐久性比较可靠的方法，但是大气暴露试验存在试验时间长、试验成本高、管理难度大等问题，因此主要用于基础研究和科研开发。为了满足生产、验收等工作的需要，人们开发了一系列人工老化试验来对耐久性进行评价，其中较常用的是耐中性盐雾试验和紫外灯加速老化试验。前者主要评价涂层耐氯离子腐蚀的能力，后者主要评价涂层耐光（特别是紫外光）老化的能力。此外，彩涂板可能会用于酸雨、潮湿等特殊环境，此时还应选择相应的人工老化试验（如耐酸碱试验、耐湿热试验等）进行评价。需要注意的是由于人工老化试验通常无法完全模拟实际使用环境，因此确定人工老化试验结果和实际美观寿命和首次大修寿命之间直接和确切的对应关系是非常困难的。

其他性能

某些使用环境要求彩涂板具有良好的耐有机溶剂性、耐酸碱性、耐污染性等性能，对于这些特殊性能应给予足够重视，以便满足使用的要求。

► 反面涂层性能的选择

反面涂层的性能通常由供方根据用途、使用环境来选择。使用环境的腐蚀性不高时，反面通常只涂覆一层，起一定耐蚀作用。如果反面粘贴隔热材料，应在订货时说明，以便供方在反面涂覆有良好粘结性能的涂料。使用环境的腐蚀性高时应涂覆二层，以提高耐腐蚀性。

Coating durability

The durability of the coating is the performance reflected by prepainted steel board during use, usually measured by the length of its aesthetic lifespan and the first major overhaul lifespan. The durability of coatings is closely related to factors such as the type of coating, coating thickness, and corrosiveness of the usage environment. The atmospheric exposure test is a reliable method for evaluating the durability of coatings, but it has problems such as long testing time, high testing cost, and difficult management. Therefore, it is mainly used for basic research and scientific research development. In order to meet the needs of production, acceptance and other work, a series of artificial aging tests have been developed to evaluate durability, among which the most commonly used are neutral salt spray resistance test and UV accelerated aging test. The former mainly evaluates the ability of coatings to resist chloride ion corrosion, while the latter mainly evaluates the ability of coatings to resist light (especially ultraviolet light) aging. In addition, prepainted steel boards may be used in special environments such as acid rain and humidity, and corresponding artificial aging tests (such as acid alkali resistance test, moisture heat resistance test, etc.) should also be selected for evaluation. It should be noted that due to the fact that artificial aging tests usually cannot fully simulate the actual usage environment, it is very difficult to determine the direct and accurate correspondence between the results of artificial aging tests and the actual aesthetic life and the first major overhaul life.

Other performance

Some usage environments require prepainted steel boards to have good properties such as organic solvent resistance, acid and alkali resistance, and pollution resistance. Sufficient attention should be paid to these special properties in order to meet the usage requirements.

► Selection of performance of reverse coating

The performance of the reverse coating is usually selected by the supplier based on the purpose and usage environment. When the corrosiveness of the usage environment is not high, the reverse side is usually only coated with one layer, which has a certain anti-corrosion effect. If insulation material is pasted on the reverse side, it should be specified at the time of ordering so that the supplier can apply a coating with good bonding performance on the reverse side. When the corrosive environment is high, a second layer should be applied to improve corrosion resistance.



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使用指南

储存、运输和装卸

Storage, Transportation, and Loading / Unloading

储存、运输和装卸是影响彩涂板质量的重要环节。如果操作不当，储存、运输和装卸过程中可能出现划伤、压印、腐蚀等各种缺陷。为尽可能减少和避免各类缺陷的产生，下面简要介绍一些操作中的注意事项。关于储存、运输和装卸方面的具体规定可参考有关资料或向专家咨询。

► 储存

彩涂板应存放在干净整洁的环境中，避免各种腐蚀性介质的侵蚀。

储存场地的地面应平坦、无硬物并有足够的承重能力。

卧式钢卷应放在橡皮垫、垫木、托架等装置上，捆带锁扣应朝上，不能直接放在地面上或运输工具上。

为避免产生压伤，钢卷通常不堆垛存放。钢板堆垛存放时应严格限制堆垛层数，将重量和尺寸大的板包放在下面。

产品应存放在干燥通风的室内环境中，避免露天存放以及存放在易发生结露和温差变化大的地方。

储存场地应留有足够的空间供吊运设备使用。

应对钢板和钢卷的存储位置进行合理的安排以便于取用，尽

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可能减少不必要的移动。

应注意彩涂板的力学性能和涂层性能可能会随储存时间的增加而变化。

► 运输和装卸

产品应按照出厂时的状态进行运输,不能随意拆卸原有包装。装卸时吊具与产品间应加橡皮垫以防止发生碰伤,有条件的情况下应使用专用吊具。

运输车辆的车厢应打扫干净,车底板上应铺橡皮垫或其他防护装置,车厢四周也应采取必要的防护措施,防止包装产生压痕或碰伤。

立式包装的钢卷在运输和装卸时也应保持立式。

产品应固定牢固,避免在运输时产生相对移动或滚动而造成产品损伤或发生意外事故。

钢板在取出时不能拖拉,以防止切口和切断时产生的毛刺擦伤下面的钢板。钢板应轻拿轻放,不要碰到其他硬物。

- Storage, transportation, and loading/unloading are important links that affect the quality of prepainted steel boards. If operated improperly, various defects such as scratches, imprints, corrosion, etc. may occur during storage, transportation, loading and unloading processes. To minimize and avoid the occurrence of various defects as much as possible, the following is a brief introduction to some precautions during operation. Specific regulations regarding storage, transportation, and loading/unloading can be found in relevant materials or consulted with experts.

► Storage

Prepainted steel boards should be stored in a clean and tidy environment to avoid corrosion from various corrosive media. The ground of the storage site should be flat, free of hard objects, and have sufficient load-bearing capacity.

Horizontal steel coils (Eye to wall) should be placed on rubber pads, wooden pads, brackets, and other devices. The binding buckle should face upwards and cannot be directly placed on the ground or transportation vehicles.

To avoid crushing, steel coils are usually not stacked for storage. When storing steel plates in stacks, the number of stacking layers should be strictly limited, and large weight and size plate packages should be placed below.

The product should be stored in a dry and ventilated indoor environment, avoiding outdoor storage and storage in areas prone to condensation and large temperature differences.

The storage site should have sufficient space for the use of lifting equipment.

Reasonable arrangements should be made for the storage location of steel plates and coils to facilitate access and minimize unnecessary movement.

It should be noted that the mechanical and coating properties of prepainted steel plates may vary with increasing storage time.

► Transportation and loading/unloading

The product should be transported in its original factory condition and the original packaging should not be disassembled at will.

Rubber pads should be added between the lifting equipment and the products during loading and unloading to prevent collision. If conditions permit, specialized lifting equipment should be used.



The carriage of the transport vehicle should be cleaned, and rubber pads or other protective devices should be placed on the bottom of the carriage. Necessary protective measures should also be taken around the carriage to prevent packaging from being creased or damaged.

Steel coils packaged vertically should also be kept upright during transportation and loading/unloading.

The product should be firmly fixed to avoid relative movement or rolling during transportation, which may cause product damage or accidents.

The steel plate cannot be dragged during removal to prevent burrs generated during cutting and cutting from scratching the steel plate below. Steel plates should be handled with care and not come into contact with other hard objects.



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► 彩涂板的加工

加工是影响彩涂板质量的重要环节，为了保证产品质量，下面简要介绍加工时的一些注意事项。关于加工方面的具体规定可参考有关资料或向专家咨询。

彩涂板因其表面有涂层，因此在加工时与普通冷轧板和镀层板存在很多不同的地方，最主要的区别就是必须在保证涂层完好的前提下进行成形加工。加工时的注意事项如下：

力学性能（如屈服强度、抗拉强度、伸长率）是衡量成形性的重要指标，是确定和调整加工工艺的重要参数，是加工时考虑的主要因素之一。

涂层性能（如铅笔硬度、T 弯值、冲击功）与加工性能有密切的联系，是加工时考虑的另一个主要因素。

彩涂板的部分力学性能（如屈服强度、伸长率）和部分涂层性能（如铅笔硬度、T 弯值、冲击功）通常会随储存时间的增加而变化，从而对加工成形产生影响，对此应给予足够的重视。

Service Guide

使用指南

加工 Processing

零件的形状复杂、变形程度较大时，应采用多道次成形。如果一次成形，可能会因变形量过大破坏涂层的附着力。加工时应根据模具形状、变形特点、工艺条件等因素设定合适的间隙，间隙设定时应考虑涂层的厚度。

大多数涂层可作为固体润滑剂，并可满足多数成形工艺的润滑要求，有些涂料可通过调整配方提高涂层的润滑性。如涂层的润滑性不足，可通过涂油、涂蜡、覆可剥离保护膜等方法提高润滑性。

但应注意湿润剂容易吸污物，应在安装前清除，可剥离保护膜在加工结束后也应尽快去除。

应根据设备状况、工艺条件、零件形状等因素设定合理的加工速度，变形速度过高容易导致涂层剥落。温度低时涂层的柔韧性降低，因此应避免低温加工。若环境温度较低，应将材料预热到一定温度后再进行加工。

加工时产生的切口断面易发生腐蚀，因此应采取必要的防护措施，如涂防护涂料、嵌封条等。

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加工时应尽量减少切断面的毛刺，防止毛刺划伤表面。
应保持所有与涂层接触的表面干净整洁，及时清理加工时产生的切屑和金属颗粒，防止异物损坏涂层表面。
加工时应尽量减少成型辊辊面或模具表面的磨损，保持接触面光洁，防止涂层表面产生压痕、划伤等缺陷。
应尽可能采用工厂预先装配后再送现场进行安装的施工方式，安装时应采取保护措施防止损坏涂层。
加工时如发现涂层表面破损应及时采用专用修补涂料进行修补，防止破损处发生腐蚀。

► Processing of prepainted steel board

Processing is an important link that affects the quality of prepainted steel boards. In order to ensure product quality, the following briefly introduces some precautions during processing. Specific regulations regarding processing can refer to relevant materials or consult experts.

Prepainted steel sheet has a coating on its surface, so there are many differences between it and ordinary cold-rolled sheet and coated sheet during processing. The main difference is that it must be formed while ensuring the integrity of the coating. The precautions during processing are as follows: Mechanical properties (such as yield strength, tensile strength, elongation) are important indicators for measuring formability, important parameters for determining and adjusting processing technology, and one of the main factors considered during processing.

The coating performance (such as pencil hardness, T-bend value, impact energy) is closely related to the processing performance and is another major factor considered during processing.

The partial mechanical properties (such as yield strength, elongation) and partial coating properties (such as pencil hardness, T-bend value, impact energy) of color coated plates usually change with the increase of storage time, which affects the processing and forming, and should be given sufficient attention.

When the shape of the part is complex and the degree of deformation is large, multi pass forming should be adopted. If formed in one go, it may damage the adhesion of the coating due to excessive deformation.

During processing, appropriate gaps should be set based on factors such as mold shape, deformation characteristics, and process conditions, and the thickness of the coating should be considered when setting the gaps.

Most coatings can serve as solid lubricants and meet the lubrication requirements of most forming processes. Some coatings can improve their lubricity by adjusting their formulations. If the lubricity of the coating is insufficient, it can be improved by applying oil, wax, or a peelable protective film. However, it should be noted that wet lubricants are prone to absorbing dirt and should be removed before installation. The peelable protective film should also be removed as soon as possible after processing.

Reasonable processing speed should be set based on factors such as equipment condition, process conditions, and part shape. Excessive deformation speed can easily lead to coating peeling. When the temperature is low, the flexibility of the coating decreases, so low-temperature processing should be avoided. If the ambient temperature is low, the material should be preheated to a certain temperature before processing.

The cut surface generated during processing is prone to corrosion, so necessary protective measures should be taken, such as applying protective coatings, sealing strips, etc.

During processing, burrs on the cut surface should be minimized as much as possible to prevent burrs from scratching the surface.

All surfaces in contact with the coating should be kept clean and tidy, and chips and metal particles generated during processing should be promptly cleaned to prevent foreign objects from damaging the coating surface.

During processing, efforts should be made to minimize wear on the forming roller surface or mold surface, maintain a smooth contact surface, and prevent defects such as indentation and scratches on the coating surface.

The construction method of factory preassembly and then on-site installation should be adopted as much as possible, and protective measures should be taken during installation to prevent damage to the coating.

If any damage is found on the surface of the coating during processing, special repair coating should be used in a timely manner to prevent corrosion at the damaged area.

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